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TABLE OF CONTENTS ON 3rd COVER

Without any stimulation of the central nervous system whatever, Solutions 'Tuamine Sulfate' (2-Aminoheptane Sulfate, Lilly), when applied intranasally, produce long-lasting, uniform shrinkage of the nasal mucous membrane. Furthermore, Solutions 'Tuamine Sulfate' do not impair ciliary motility and there is no secondary vasodilatation. Solution 'Tuamine Sulfate,' 1 percent, is intended for routine use and is the solution of choice for prescriptions. The 2 percent solution is supplied for application in the doctor's office when a more intense effect may be desired. Solutions 'Tuamine Sulfate' are available at all prescription pharmacies.

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The Journal of Pediatrics

VOL. 29 SEPTEMBER, 1946 NO. 3

Original Communications

ORAL MANIFESTATIONS OF CONGENITAL HEART DISEASE

A PRELIMINARY REPORT

ABRAHAM KANER, B.S., D.M.D., PAUL K. LOSCH, D.D.S., AND HYMAN GREEN, M.D.
BOSTON, MASS.

IN A CLINIC devoted to congenital heart disease it was noted by one of us (H. G.) that children with marked cyanosis complained occasionally of toothache. To explain this symptom the dental department was consulted. This study was then undertaken to demonstrate the marked changes which occurred in the buccal mucous membrane, gingivae, and tongue as a result of circulatory congestion.

The diagnoses of the congenital heart malformations were made after careful consideration of the clinical, roentgenographic, and electrocardiographic findings.[1]

One hundred and thirteen children presenting different types of congenital heart disease were examined at The Children's Hospital, Boston. These patients varied in age from 10 months to 12 years. Among the children examined, eighteen had the tetralogy of Fallot; seven, coaretation of the aorta; three, dextrocardia; four, transposition of the great vessels; sixteen, patent ductus arteriosus; fifty-two, septal defects; ten, persistent ostium primum; and three, tetralogy of Eisenmenger.

The lips, cheeks, oral mucous membranes, tongue, gingivae, teeth, pharyngeal fauces, and occlusion of these children were examined. Bite wing and periapical x-rays were taken on all individuals except where not possible due to extreme youth.

We have grouped our findings under the different conditions presented:

I. *Tetralogy of Fallot.*—The most striking oral observations were seen in this group of children. The tetralogy of Fallot is characterized by (a) pulmonary stenosis, (b) enlargement of the right ventricle, (c) defect in the interventricular septum, and (d) dextroposition of the aorta.[2]

1. ***Lips:*** The mucous membranes of the lips were purplish-blue in color. The cyanosis was very marked in all patients.

From the Harvard Medical School, Harvard School of Dental Medicine, the Dental and Cardiac Clinics of The Children's Hospital.

2. *Buccal mucous membranes:* The mucous membranes of the cheeks were dark bluish-red. The membranes had a pronounced wrinkling. It is our opinion that this wrinkling indicates a transient edema.
3. *Gingivae:* In all cases, a severe marginal gingivitis was present. The gingivae were dark bluish-red and very markedly inflamed. Bleeding was produced on very slight pressure (e.g. mechanical or digital). This gingivitis was generalized, but the gingivae in the anterior portion of the maxilla (from cuspid to cuspid) were more seriously involved.
4. *Tongue:* The dorsum of the tongue in these patients presented a very bright bluish-red appearance. The tongues were deeply fissured and edematous. The middle and posterior thirds were heavily coated with a smooth, brownish-white, closely adherent material. The fungiform and filiform papillae were markedly raised, very prominent, and extremely reddened. In three cases, atrophy of the filiform and fungiform papillae was noted. The blood vessels on the inferior surface of the tongue were very prominent. This tongue has been appropriately called a "chow" tongue. (Figs. 1 and 2.)
5. *Floor of mouth and pharyngeal fauces:* Marked cyanosis of both of these structures was noted.
6. *Occlusion:* The occlusion in these patients was found to be normal. However, several cases were observed which presented a marked anterior overbite. Our period of observation has not been long enough to determine the significance of this condition.
7. *Teeth:* The teeth in these children were found to be normal in size and shape. However, in most cases there was a delay in the eruption time of both the deciduous and permanent teeth. One case was seen in which a spontaneous abortion of the crowns of the maxillary incisor teeth occurred at 18 months of age. Continued studies are being made on the chronology of tooth eruption.

   In all cases observed, the incidence of carious lesions of the teeth was markedly elevated.

   Several teeth were extracted under topical anesthesia, and histologic sections revealed that there was a dilatation and engorgement of the capillaries in the dental pulp. Rupture of several capillaries was noted with an escape of red and white blood corpuscles into the connective tissue stroma of the pulp. The predentin layer was abnormal and the dentine was poorly calcified. The odontoblastic layer was irregular and several odontoblastic cells were pyknotic. The pulp was edematous. (Figs. 3 and 4.)
8. *X-rays:* Bite wing and periapical x-rays revealed that the alveolar bone and basal bone displayed no appreciable changes.

II. *Tetralogy of Eisenmenger.*—In the tetralogy of Eisenmenger there is less cyanosis and clubbing than in the tetralogy of Fallot. In the Eisenmenger type there is hoarseness, while this symptom is absent in the Fallot type. There is also a pulmonary insufficiency with a diastolic murmur in this condition. The

J. PEDIAT.
VOL. 29, NO. 3, SEPT., 1946

Fig. 1.

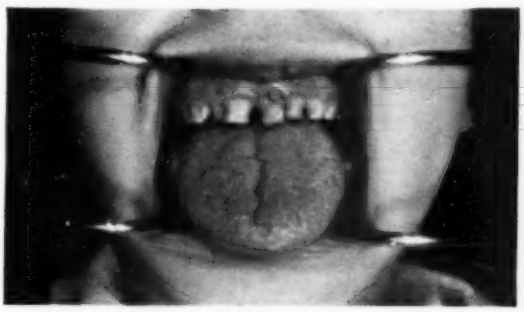


Fig. 2.

Figs. 1 and 2.—Illustrating the marked cyanosis of the lips, buccal mucous membrane, and tongue. In addition, note the prominence and extreme redness of the filiform and fungiform papillae. Fig. 1 is an 8-year-old child; Fig. 2 is a 10-year-old child.

Figs. 3 and 4.—Showing low- and high-power views of extracted teeth, displaying a marked engorgement of the capillaries in the pulp. Also note the predentin and the irregular odontoblastic layer.

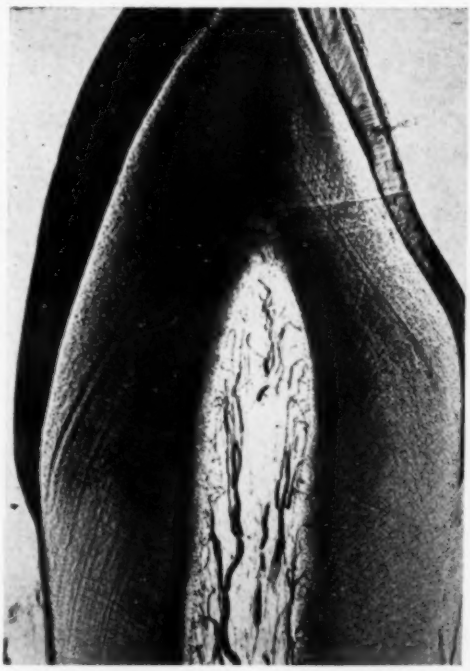
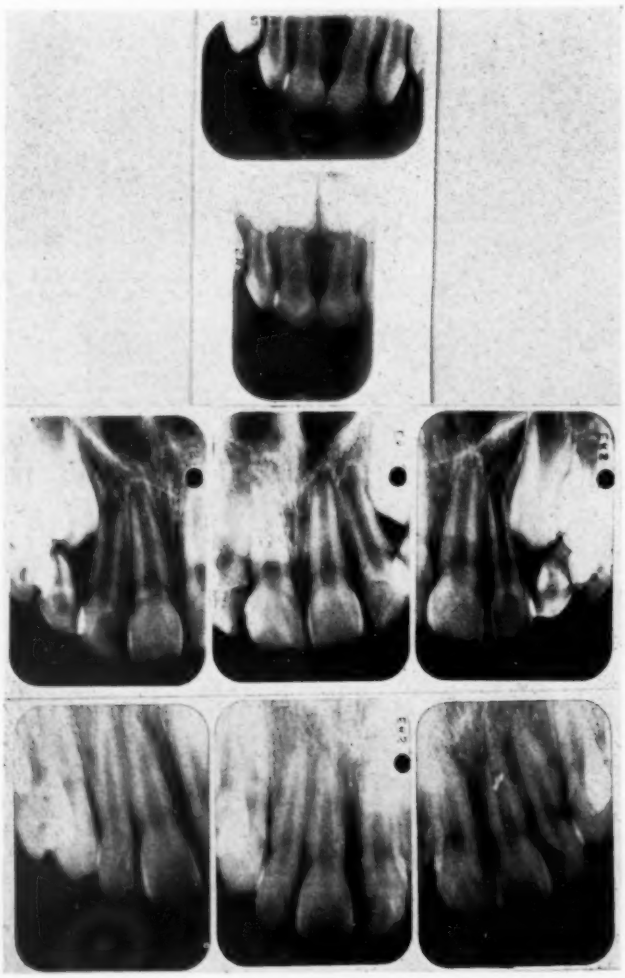


Fig. 5.—Low-power view of a post-mortem disassociated tooth displaying marked engorgement of the capillaries in the dental pulp.

x-ray picture is characteristic, since the pulmonary artery in the Eisenmenger type shows a bulge in the region of the conus, as contrasted to an absence of shadow in the tetralogy of Fallot.

The lips, cheeks, and buccal mucous membranes were markedly cyanotic, but the cyanosis was less severe than that seen in the Fallot type. There was a very severe generalized marginal gingivitis, and the appearance of the gingivae was similar to that seem in the tetralogy of Fallot. The tongue presented the same clinical appearance as that seen in the Fallot type. Periapical and bite wing x-rays appeared normal.



Figs. 6, 7, and 8.—Ages 3, 8, and 12 years, respectively, illustrating the markedly enlarged, funnel-shaped pulp canals in the maxillary central and lateral incisor teeth.

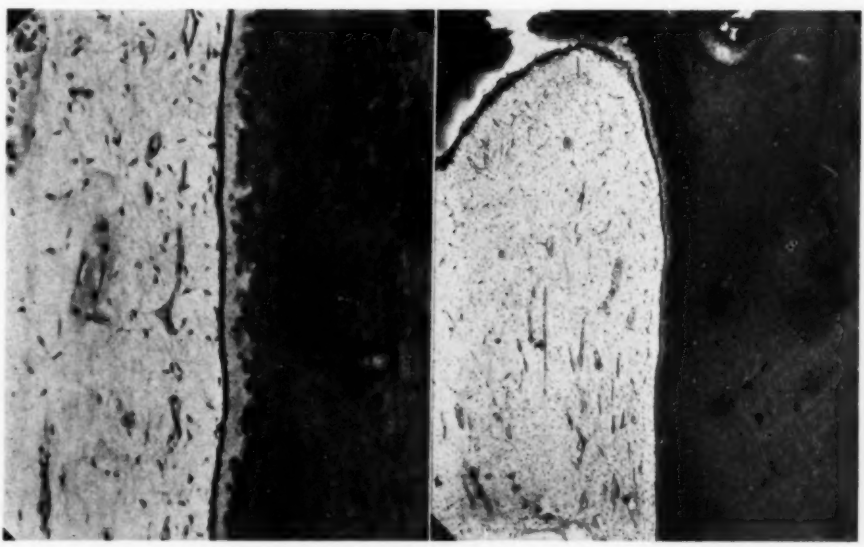
III. *Transposition of the Great Vessels.*—In these cases it is found that the aorta arises from the right ventricle and the pulmonary artery from the left.

In four cases which presented transposition of the great vessels, it was found that a less severe marginal gingivitis existed than was observed in the tetralogy of Fallot. The gingivitis was generalized. The lips, cheeks, buccal mucous membranes, floor of the mouth, pharyngeal fauces, and tongue had a similar appearance to that seen in the tetralogy but the cyanosis was less marked. X-ray examination revealed no observable defects.

Histologic examination of the teeth revealed that the pulp was edematous and the blood vessels were markedly dilated and engorged with blood cells. (Fig. 5.)

IV. *Coarctation of the Aorta.*—This condition is characterized by a narrowing of the aorta in the region where it is joined by the ductus arteriosus. Clinical examination of these individuals revealed that the gingivae of the premaxilla were markedly reddened and inflamed. There was no wrinkling and no edema of the mucous membranes. The caries index was usual for this age group and geographic area and no consistent abnormalities of occlusion were noted.

Periapical x-rays revealed the pulps of the four maxillary incisors (deciduous and permanent) to be markedly enlarged. They were funnel-shaped, occupying a great portion of the crown and root of each tooth. The selection of these teeth alone for this abnormality is not yet understood. The pulps of the molar teeth appeared to be normal in size and shape. (Figs. 6, 7, and 8.) It is our opinion that this enlargement of the root canals may be due to the marked arterial hypertension which characterizes this condition. This was the



Figs. 9 and 10.—Microscopic views of a tooth recovered from a patient with coarctation of aorta.

only type of congenital heart disease examined by the authors in which such an observation was made.

Histologic examination of the teeth revealed that the capillaries in the pulp were markedly dilated and prominent. The dentine was poorly calcified. The predentin layer appeared normal in width. The odontoblastic layer was regular and the cells were normal in shape and size. Several vacuoles were present in the pulp which were sparsely lined with a single layer of flattened cells and were not judged to be lymphatic channels. (Figs. 9 and 10.)

V. *Dextrocardia.*—In dextrocardia, the heart is located in the right chest, and in three cases no demonstrable deviation from the normal was observed in the oral cavity or surrounding structures.

VI. *Patent Ductus Arteriosus.*—Sixteen children were seen in which the ductus arteriosus failed to become obliterated. We observed no oral symptoms clinically and no apparent changes were noted on x-ray examination.

VII. *Septal Defects.*—Fifty-two children presenting interauricular and interventricular septal defects were seen. We observed no evident abnormalities on clinical and x-ray examination.

VIII. *Persistent Ostium Primum.*—Clinical examination of these individuals revealed that the gingivae showed a slightly glazed appearance of the interdental papillae. The papillae were slightly reddened. This redness was more marked in the maxillary incisor region. The papillae of the tongue were prominent and slightly reddened. The tongue in these individuals had a greyish-white coating. No other clinical observations on the mouth and teeth were significant. The authors observed no abnormalities on x-ray examination.

SUMMARY

1. A description and discussion is given of the observations made on the teeth and surrounding structures as seen in the following conditions: tetralogy of Fallot, coarctation of the aorta, dextrocardia, transposition of the great vessels, patent ductus arteriosus, septal defects, persistent ostium primum, and tetralogy of Eisenmenger.

2. The most striking changes are observed in the papillae of the tongue, the mucous membranes, and gingivae in the tetralogy of Fallot. Similar but less marked changes in these structures are seen in the tetralogy of Eisenmenger, and in transposition of the great vessels. In coarctation of the aorta the pulp canals in the maxillary incisors are found to be markedly enlarged and funnel-shaped.

3. No observable oral manifestations were noted in dextrocardia, patent ductus arteriosus, and septal defects.

The authors wish to express their gratitude to Drs. J. Wallace and C. Campelia, and to Miss Mary Connor for their invaluable help in the preparation of this paper.

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THE USE OF A SULFADIAZINE-SULFATHIAZOLE MIXTURE IN THE TREATMENT OF CHILDREN

DAVID LEHR, M.D., LAWRENCE SLOBODY, M.D., AND WILLIAM GREENBERG, M.D.
NEW YORK, N. Y.

INTRODUCTION

DESPITE the advent of penicillin, the sulfonamides will undoubtedly continue to play an important role in the therapy of human infections. The reasons become obvious if one considers briefly the comparative merits of penicillin and the sulfonamide compounds.[1-6] With the exception of staphylococcal septicemia and the treatment of infections due to nonhemolytic streptococci and streptococci of the viridans type, penicillin has not proved superior or only slightly superior to the sulfonamides commonly employed at present in bacterial infections. The sulfonamides, furthermore, are effective against the primary and secondary invaders of bacillary dysentery, *Escherichia coli,* and to some extent also against *Bacillus proteus, Bacillus pyocyaneus* and *Hemophilus influenzae,* whereas penicillin is ineffective against these organisms. In addition, penicillin fastness is being observed with increasing frequency.

In the light of these considerations, it appears highly desirable to continue all efforts which might lead to elimination or at least diminution of serious toxic reactions caused by the sulfonamides. The most dreaded of these are damage to the blood-building organs and renal complications. The first, which may lead to agranulocytosis, is fortunately rare; it can neither be anticipated nor prevented, although reduction in the total period of therapy might possibly decrease the incidence of damage to the hematopoietic system. Kidney lesions, on the other hand, are encountered frequently. They are caused predominantly by intratubular deposition of sulfonamide crystals, in other words by a mechanical factor; their incidence is, therefore, amenable to reduction with the help of adequate precautionary measures.

The precipitation of sulfonamides in the urinary tract is largely dependent upon the solubility and concentration of these compounds in the tubular urine. Hence, any measure increasing the solubility or preventing high urinary concentrations of the sulfonamides, should tend to diminish the incidence of drug precipitation in the urinary tract. Such measures generally employed at the bedside are the "forcing of fluids" which prevents high urinary concentration of the sulfonamides, and alkalization of the urine which increases their solubility.

Recently it was found by one of us that effective prevention of renal complications could be obtained by the therapeutic employment of sulfonamide mixtures instead of individual compounds. The observation had its origin in solubility studies with various mixtures of sulfonamides. These revealed that two or more of these compounds, when present simultaneously in water or

From the Department of Medicine and Pharmacology, and the Department of Pediatrics, New York Medical College, Flower and Fifth Avenue Hospitals.

This investigation has been aided by grants from the Josiah Macy, Jr., Foundation, the United Hospital Fund, and the Schering Corporation, Bloomfield, N. J.

urine, did not have any influence upon each other with regard to their individual solubilities. In other words, sulfathiazole, sulfadiazine, and sulfamerazine, for example, could be dissolved *simultaneously* in the same sample of water or urine to the point of full saturation of each compound when present alone. The concentration of the three drugs in a saturated solution represented, therefore, the sum total of their individual solubilities. It was reasoned that the danger of intrarenal precipitation or concrement formation from the sulfonamides comprising such a mixture "should only be as great as if each compound had been administered alone, and in the partial dosage contained in the mixture." The validity of this conception was substantiated in animal experimental studies as well as in clinical trials.[7, 8]

Extensive absorption-excretion studies in experimental animals, using various sulfonamide mixtures and different routes of administration, established a more complete absorption and elimination of drug combinations as compared with single compounds. The blood levels were accordingly higher than was expected from theoretical computations.

The in vitro antibacterial activity of sulfonamide mixtures was found to correspond largely to the total concentration of free sulfonamide. In some instances mixtures were even distinctly more effective than any of their components in identical concentration.[7]

On the basis of these experimental and preliminary clinical observations, we extended the therapeutic use of the sulfadiazine-sulfathiazole combination to a large group of infants and children.

THE ABSORPTION AND EXCRETION OF THE SULFONAMIDE MIXTURE IN CHILDREN

The primary purpose of these experiments was the comparative evaluation of the sulfonamide combination against the same total dosage of either of its components in the *same* individual. With the exception of a smaller dosage, the procedure employed was essentially the same as the one previously used in adults.[8]

Procedure.—Three boys were selected for this investigation:

1. V. G., 7 years, white. Diagnosis: contusion of the brain, malnutrition.

2. J. J., 8 years, Negro. Diagnosis: common cold, lymphadenitis of cervical glands.

3. E. T., 8 years, Negro. Diagnosis: peritonsillar abscess, possible rheumatic heart disease.

At the start of the study the three patients had completely recovered and had no apparent impairment of renal function as judged from urinalysis and determination of nonprotein nitrogen and urea nitrogen levels in the blood. Each child was given three consecutive single dose tests with 3 Gm. of sulfonamide in the sequence: sulfathiazole, sulfadiazine, sulfadiazine-sulfathiazole mixture. In order to obtain complete elimination of each drug from the body, an interval of two days was allowed to elapse between the administration of sulfathiazole and sulfadiazine, and an interval of four days between sulfadiazine and the mixture.

Each test was done in the following way: the fasting patient received 3 Gm. of sulfonamide (1.5 Gm. each of sulfathiazole and sulfadiazine in the third test) at 9 A.M. with one glass of milk followed by one glass of water. In order to insure equalized absorption, no further fluid and no food was permitted thereafter until noon. From then on, food and fluid intake were unrestricted; however, the latter was checked throughout the duration of the experiment. The concentration of free and conjugated sulfonamide was determined in blood and urine according to the method of Bratton and Marshall using a Klett-Summerson Photo Colorimeter. (Obviously no differentiation could be made between sulfathiazole and sulfadiazine in the mixture. However, both drugs have almost the same molecular weights, and identical concentrations of either give practically identical readings. No adjustments were, therefore, necessary in expressing mixture concentrations.) Blood samples were taken from the fingertip one hour, four hours, eight hours, twenty-four hours, and forty-eight hours after drug administration. Urine specimens were obtained as far as possible at the same intervals and their amount and specific gravity were recorded. The total urine output of every twenty-four-hour period for the entire ten days which the three tests required was collected for drug determination. No untoward symptoms were encountered in any of the tests.

Results.—The results of all experiments were recorded in the form of graphs, summarizing the three tests performed on each patient. The graph of Case E. T. is presented as representative of all three. As anticipated, the sulfadiazine blood level rose after four hours to about twice the height of the sulfathiazole level and this relationship continued throughout the first twenty-four-hour period. The sulfonamide mixture reached a significantly higher peak concentration than sulfadiazine alone within four hours after administration. However, because of a faster elimination, the mixture levels were not as long sustained as the sulfadiazine levels. In comparison with previous studies in adults, the mixture displayed the tendency to reach relatively higher blood levels in children (Fig. 1).

Sulfonamide concentrations in the urine from the sulfadiazine-sulfathiazole mixture were lower than those from sulfadiazine in all cases, and the urine volume higher after four to eight hours than with either compound administered separately. The acetylation in the blood ranged between 5 and 10 per cent at all intervals tested. Only after four hours the mixture gave somewhat higher values. In the urine, the degree of conjugation ranged around 10 per cent after four hours, 15 per cent after eight hours and 30 per cent after twenty-four hours. It is, therefore, assumed that in the clinical application of the mixture, the degree of conjugation would not be significantly different from the one observed with the two sulfonamides when employed separately.

The results of the absorption-excretion study confirmed the viewpoint and the experience gained in adults, that using the routine dosage and the generally accepted four-hour interval, levels as high or higher than from sulfa-

diazine alone could probably be maintained in the blood with the sulfonamide mixture. The low urine concentrations in the presence of high blood levels suggested a possible added protection for the kidney.

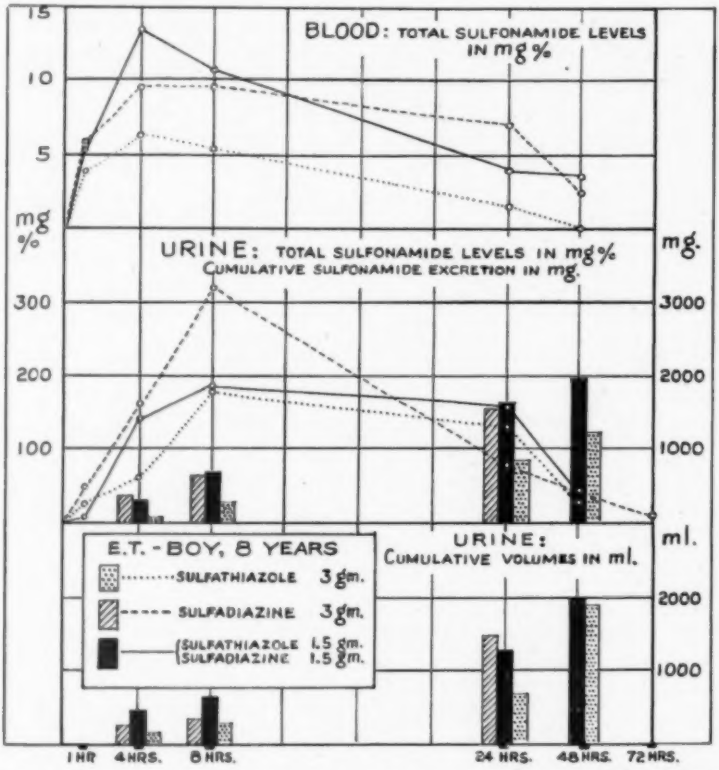

Fig. 1.—Absorption and excretion of a single oral dose of sulfadiazine, sulfathiazole, and a sulfadiazine-sulfathiazole mixture in the same individual. (The forty-eight-hour urine sample of the sulfadiazine test was lost.)

THE THERAPEUTIC APPLICATION OF THE SULFONAMIDE MIXTURE

Treatment with a mixture containing equal parts of sulfadiazine and sulfathiazole was carried out in more than 200 unselected children and infants with acute bacterial infections. The first 47 cases were studied under carefully controlled and standardized conditions. Special consideration was given to daily follow-up studies of the sulfonamide concentration in blood and urine, to the frequency in the occurrence of sulfonamide crystals in the urine and its relationship to the urinary pH and drug concentration, and to any signs or symptoms of renal complications. Patients treated after completion of this study on the first 47 cases were also carefully observed, but determination of the sulfonamide concentration in the blood was done only every third day and in the urine only occasionally.

From the experience gained in animal experimental studies and from the treatment of adults, it appeared safe to omit adjuvant alkali therapy. This was done in order to evaluate the protection afforded by employing sulfonamide mixtures under the increased risk of an acid urine reaction.

Procedure.—Before institution of therapy, information on the state of the kidney was gathered from urinalysis, and determination of the creatinine and nonprotein nitrogen level in the blood. A complete blood count was done and, whenever possible, culture material for bacteriologic diagnosis was obtained.

The sulfadiazine-sulfathiazole mixture was given orally. The first day's total dosage employed in this series was 1.5 grains of the mixture per pound (about 0.2 Gm. per kilogram) of body weight. One-third of the first day's dose was given at the onset of therapy and the remainder was divided into five equal amounts given at four-hour intervals. This maintenance dose was continued on the following day and thereafter at four-hour intervals until defervescence and other clinical signs indicated significant improvement, whereupon the interval of administration was prolonged to six hours.

The entire fluid intake and output were checked carefully. The intake was kept at 2½ to 3 ounces of fluid per pound per day in infants. Older children received 1,200 to 2,000 c.c. of fluid daily. In most cases it was attempted to give fluids by mouth; when this was difficult, parenteral hypodermoclyses of infusions of 2½ per cent glucose and physiologic saline were used. No alkalizing agents were employed at any time.

The collection of the total urine output was not attempted in infants because of obvious mechanical difficulty; however, an early morning specimen was obtained daily for determination of pH and drug concentration and for examination of the sediment for sulfonamide crystals. In larger children samples of the entire twenty-four-hour output were examined daily for specific gravity, pH (Cambridge Electron-Ray pH Meter), albumin, microscopic findings in the sediment, and drug concentration. The first morning specimen was collected separately for determination of the pH and examination of the sediment for urinary crystals. Since this specimen is usually the most concentrated and most acid, it was the most likely to contain urinary crystals. The total amount of sulfonamide excreted with the urine was estimated for every twenty-four-hour period throughout the time of drug administration.

Blood for determination of the free and total sulfonamide level was collected every morning at 9 A.M. Complete blood counts were performed every third day.

Results.—The first 43 cases treated with the sulfadiazine-sulfathiazole mixture are briefly summarized in tabular form (Table I), in order to indicate especially the relationship between duration of treatment, total amount of sulfonamide used, and therapeutic results observed.

Two of the cases listed in the table were chosen for graphic demonstration because of their representative illustration of absorption and excretion of the sulfonamide mixture (Fig. 2).

The most significant observations made in the 200 children under treatment with the sulfonamide mixture, can be derived from Table I and Fig. 2. Briefly summarized the findings were as follows: The therapeutic effectiveness of the sulfadiazine-sulfathiazole mixture was highly satisfactory and the period of treatment was rather short in most instances. The total amounts of sulfonamide used were consequently small. Therapeutically effective blood levels were maintained with ease and discontinuation of therapy resulted in rapid elimination of the sulfonamide mixture from the body. Conjugation figures were low, ranging as a rule between 3 and 15 per cent in the blood and 10 and 30 per cent in the urine. Crystalluria was infrequent and never "massive." Its occurrence was limited to excessive drug concentrations in the presence of an acid urine reaction. Allergic signs such as drug fever or rash were observed in only two instances. Nausea and vomiting were rare. No other toxic reactions were encountered.

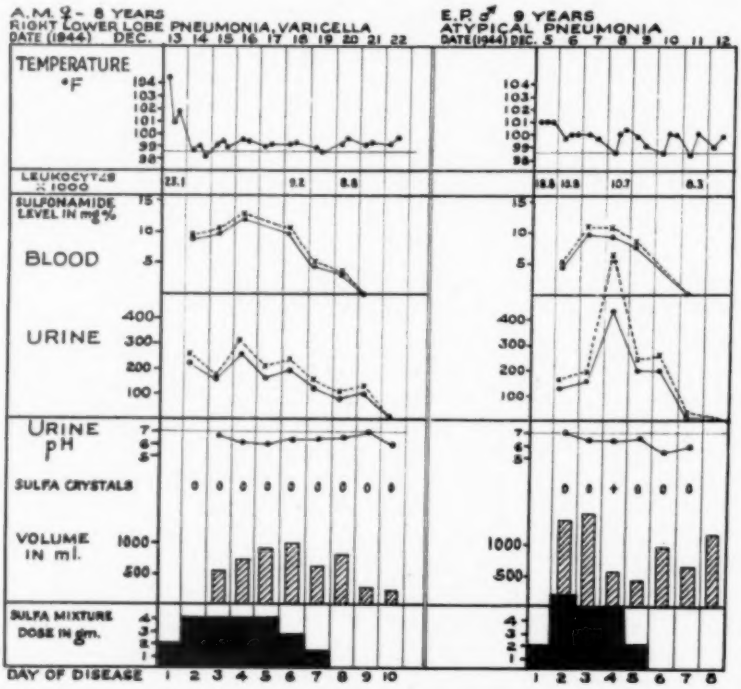
A.M. ♀ - 8 YEARS
RIGHT LOWER LOBE PNEUMONIA, VARICELLA
DATE (1944) DEC. 13 14 15 16 17 18 19 20 21 22
E.P. ♂ 9 YEARS
ATYPICAL PNEUMONIA
DATE (1944) DEC. 5 6 7 8 9 10 11 12
TEMPERATURE °F
LEUKOCYTES ÷ 1000
SULFONAMIDE LEVEL IN mg%
BLOOD
URINE
URINE pH
SULFA CRYSTALS
VOLUME IN ml.
SULFA MIXTURE DOSE IN gm.
DAY OF DISEASE 1 2 3 4 5 6 7 8 9 10
1 2 3 4 5 6 7 8

Fig. 2.—The broken lines indicate total sulfonamide concentrations. The daily temperatures were recorded at 8 A.M., 4 P.M., and 8 P.M.

COMMENT

When employed individually, sulfadiazine and sulfathiazole are generally recognized as the most effective sulfonamides with regard to scope and intensity of antibacterial action, and as the least troublesome with regard to sub-

jective discomfort to the patient. They are also about equally dangerous to the kidney and very similar in all other aspects of clinical toxicology, except for the higher incidence of rash and drug fever induced by sulfathiazole.[9, 10] These observations apply to children[11] as well as to adults, although renal complications occur less frequently in young individuals.[12]

The administration of the sulfadiazine-sulfathiazole mixture in the present study confirmed the expectation of a low clinical toxicity and remarkable therapeutic effectiveness of this drug combination. It is noteworthy, in particular, that no instance of any renal complication was encountered, despite the intentional omission of adjuvant alkali therapy. This observation is in good agreement with the fact that sulfonamide crystals in the urine were found only infrequently. The crystalluria was, in addition, not of the "massive" type observed so commonly during therapy with sulfadiazine and especially sulfathiazole.[13] It was emphasized in previous publications[8, 14] that it is primarily the mechanical factor of intratubular deposition of poorly soluble crystals which accounts for most renal complications from sulfonamides, rather than any primary chemical nephrotoxic action. The significant reduction in the tendency to oversaturation and consequently to intrarenal precipitation by the use of sulfonamide mixtures, would, therefore, sufficiently explain the absence of renal complications. However, it should be kept in mind that the protection afforded to the kidney by the employment of sulfonamide mixtures is obviously limited and should not lead to the neglect of generally accepted preventive measures such as adequate fluid intake and alkalization of the urine.[3, 15]

It was noted also that the sulfadiazine-sulfathiazole combination, when administered orally, resulted in blood levels as high or significantly higher than from equal amounts of sulfadiazine. According to mathematical computations (algebraic sum of sulfadiazine and sulfathiazole levels, divided by two, Fig. 1), the blood level from the mixture should be far below the sulfadiazine level. Since the urinary excretion of the mixture was usually equal to or more complete than the elimination of either sulfadiazine or sulfathiazole in identical amounts, it seems reasonable to assume that the combination was more quickly and more completely absorbed from the gastrointestinal tract than either of its components. This observation can be explained by the relatively more complete utilization of smaller amounts of drug and was borne out in standardized absorption-excretion studies with laboratory animals.[16] In its ease of maintaining highly effective blood levels the mixture retained the advantage of sulfadiazine, whereas its faculty of more ready elimination from the body was apparently due to the presence of sulfathiazole. A further advantage was seen in the low percentage of conjugation.

The rapid therapeutic response to the sulfadiazine-sulfathiazole mixture was its most remarkable feature. It pointed toward an actual higher antibacterial efficacy of the combination. This viewpoint is in good agreement with the actual potentiation of therapeutic activity observed in vitro with mixtures of two or more sulfonamides.[7] It was this high effectiveness of the mixture which induced us to attempt discontinuation of therapy more abruptly

TABLE I

CASE	AGE (YR.)	SEX	RACE	DIAGNOSIS	DAYS OF TREATMENT	DEFERVESCENCE AFTER DAYS	TOTAL SULFA DOSE (GM.)	REMARKS
1. J. G.	4	M	W	Bronchopneumonia, impetigo	6	1	16.0	Recovery
2. J. V.	5	M	W	Bronchiolitis, pleural effusion	5	3	19.0	Recovery
3. J. S.	8½	M	W	Follicular tonsillitis	3	1	11.6	Recovery
4. A. I.	1½	M	W	Bacillary dysentery (Shigella sonnei)	6	1	16.5	Recovery
5. R. Q.	3	M	W	Follicular tonsillitis, tracheobronchitis, congenital heart disease	4	2	14.5	Recovery
6. F. R.	2	M	W	Bronchiolitis	5	1	11.2	Recovery
7. M. B.	5	F	N	Tracheobronchitis	5	3	19.1	Recovery
8. J. G.	6	F	W	Lobar pneumonia (R.M.L.)	10	2	32.6	Recovery
9. A. A.	2/3	F	W	Bronchiolitis, nutritional anemia	2	1	2.9	Recovery
10. E. P.	9	M	W	Atypical pneumonia	5	–	18.9	Temperature varied between 98.6 and 100.4° F. for 16 days
11. A. M.	8	F	W	Lobar pneumonia (R.L.L.), varicella	6	1	23.3	Recovery
12. R. V.	¾	M	W	Bronchiolitis, otitis media	3	1	9.0	Recovery
13. J. C.	1½	M	W	Bronchiolitis, otitis media	5	1	13.2	Recovery
14. W. B.	1½	M	W	Pyelonephritis, *B. pyocyaneous*	9	5	21.0	Recovery
15. J. E.	½	M	W	Pneumonitis (R.V.L.), pleurisy	3	1	3.6	Recovery
16. M. R.	3½	F	W	Follicular tonsillitis, cervical adenitis	4	2	13.2	Recovery
17. C. P.	2½	F	W	Purulent otitis media	5	3	13.7	Recovery
18. M. B.	10	F	W	Follicular tonsillitis, cervical adenitis	2	1	9.0	Recovery
19. R. G.	2	M	W	Tonsillitis, tracheobronchitis	6	4	15.6	Recovery
20. M. W.	6	M	W	Atypical pneumonia, pharyngitis, B. hemolytic streptococcus	5	3	21.2	Recovery
21. G. D.	1½	M	W	Tonsillitis, otitis media	7	2	11.6	Recovery
22. M. R.	4	F	W	Primary childhood tuberculosis	2	3	13.6	Sulfa discontinued when it was discovered child had tuberculosis

than is recommended as the routine procedure with single sulfonamides. Although this was done consistently, reinstitution of therapy was not found necessary in any of the cases treated.

With regard to allergic reactions, one would expect an increase in their incidence from the simultaneous employment of two sulfonamides. However, this assumption was not borne out by our experience. The two cases exhibiting allergic reactions represent an incidence of only 1 per cent. This is significantly lower than the values reported in the literature for sensitization

TABLE I—CONT'D

CASE	AGE (YR.)	SEX	RACE	DIAGNOSIS	DAYS OF TREATMENT	DEFERVESCENCE AFTER DAYS	TOTAL SULFA DOSE (GM.)	REMARKS
23. N. V.	6	F	W	Follicular tonsillitis	3	1	9.3	Recovery
24. J. T.	3	M	W	Otitis media	6	4	16.5	Recovery
25. C. S.	2/3	F	W	Bronchiolitis	5	1	8.8	Recovery
26. S. L.	1/2	M	W	Bronchiolitis	3	2	6.0	Recovery
27. D. R.	1/2	M	W	Otitis media	3	1	5.8	Recovery
28. E. S.	2	M	W	Otitis media, tracheobronchitis, meningism	7	3	16.5	Recovery, developed sulfa rash
29. E. R.	11	M	W	Follicular tonsillitis	3	1	20.5	Recovery
30. S. R.	7	F	W	Tracheobronchitis	3	1	8.0	Recovery
31. A. R.	1	F	W	Multiple rat bites, pulmonary tuberculosis	8	–	13.4	Sulfa discontinued when pulmonary tuberculosis discovered
32. J. G.	6	M	N	Lobar pneumonia (R.U.L.)	8	1	13.7	Recovery
33. A. S.	3/4	M	W	Pneumonitis, nutritional anemia	2	–	3.8	After 48 hours of sulfa the child showed little response clinically
34. R. R.	3	M	W	Tonsillitis, cervical adenitis	5	2	17.5	Recovery
35. C. G.	1½	F	N	Vincent's gingivostomatitis	4	1	6.0	Recovery
36. J. T.	1½	M	N	Bronchiolitis	2	1	6.3	Recovery
37. P. M.	1	F	W	Tonsillitis	4	2	8.0	Recovery
38. C. S.	1½	M	W	Otitis media	2	1	4.9	Recovery
39. J. A.	1/12	M	N	Bronchiolitis	3	1	2.1	Recovery
40. A. A.	1	F	W	Bronchiolitis	5	2	12.1	Recovery
41. A. M.	8	M	N	Pyelitis, micrococcus tetragenous with meningism	6	2	24.6	Recovery
42. P. B.	1	M	W	Bronchiolitis, nutritional anemia	5	1	9.0	Recovery
43. E. M.	1	F	W	Tonsillitis, tracheobronchitis	3	1	4.6	Developed morbilliform eruption 24 hours after admission. Disappeared in 24 hours

from either sulfadiazine or sulfathiazole.[8, 11, 12] The low incidence of drug allergy was explained previously[8] by the fact that the rapid therapeutic response to the sulfadiazine-sulfathiazole mixture obviated, as a rule, the prolongation of medication beyond the time when sensitization reactions are bound to occur most frequently.

The employment of sulfonamide combinations eliminates, in addition, the necessity of determining the "drug of choice" in each particular instance, since with the exception of meningeal involvement, a sulfadiazine-sulfathiazole combination should prove highly effective in all cases requiring sulfonamide therapy. Experimental work and preliminary clinical trials suggest that for the treatment of meningitis, sulfadiazine should be combined with a sulfonamide, such as sulfamerazine, which diffuses better than sulfathiazole through the hematocephalic barrier.

Lastly, the use of sulfonamide mixtures is simple and does not entail any additional work for the nursing personnel. This is especially true if the two sulfonamides are combined into one tablet or powder.

Our results suggest that the simultaneous employment of two or more sulfonamides should replace the use of single compounds, since mixtures combine a high therapeutic efficacy with a significantly lowered toxicity.

SUMMARY

1. A mixture containing equal parts of sulfadiazine and sulfathiazole was investigated with regard to its absorption, excretion, therapeutic efficacy, and toxicity in children and infants.

2. The sulfadiazine-sulfathiazole mixture was quickly absorbed from the gastrointestinal tract and readily eliminated by way of the kidneys. Peak levels as high or higher than from equal weight amounts of sulfadiazine were reached in the blood within four hours after drug administration.

3. The therapeutic results with the sulfonamide combination in 200 children with acute bacterial infections were uniformly satisfactory and conspicuous in many instances because of the speed of clinical improvement and cure.

4. The clinical toxicity of the sulfadiazine-sulfathiazole mixture was remarkably low. Crystalluria was infrequent, despite the intentional omission of adjuvant alkali therapy and no signs of renal irritation were encountered. The incidence of allergic reactions also appeared decreased.

5. The mechanism leading to reduction of toxicity and higher therapeutic efficacy by the employment of sulfonamide mixtures, instead of single compounds, is discussed.

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TO WHAT EXTENT DOES FLUORINE INGESTION LESSEN TOOTH DECAY?*

JULIAN D. BOYD, M.D., AND VIRGIL D. CHEYNE, D.D.S.
IOWA CITY, IOWA

VARIOUS studies have been published relating to the lessened incidence of tooth decay in communities where the domestic water supplies contain notable amounts of fluorides. It has become generally accepted that an inverse relationship obtains between the fluoride content of the public water supply and the average amount of caries observable in the corresponding population. Numerous reports have been published, presenting systematic analysis of the dental conditions of children living under diverse conditions as related to the presumed level of fluoride ingestion.[1-7] The data as reported in the publications cited have dealt principally with the proportion of the children studied who were free from caries, and with the average number of carious teeth for each 100 children examined.

It seems important to study further the interrelationship between fluoride exposure and caries experience. In view of the strong promotional campaigns now under way to provide for fluorinization of public water supplies as a caries-preventive measure, it would be of value to know in more quantitative terms how much reduction of caries may be expected through such a measure, and the variability to be expected from one community to another. Greater insight would be gained if the values were expressed not only in terms of group averages, but also in terms of the predicted number of children who would or would not show notable amounts of caries under the designed regimen of fluoride intake. Moreover, further data are needed to indicate whether current ingestion of fluoride may be expected to lessen caries incidence in the permanent dentition, as compared with the effect which one may observe in children whose fluoride ingestion occurs throughout the time of crown formation of the permanent teeth.

Certain communities in Iowa provide favorable facilities for the study of the effect of fluorine ingestion. Numerous wells in the State contain notable amounts of fluoride; quantities in excess of a trace have been reported from wells in all but seven of the State's 99 counties. In 44 of the counties, amounts of 1 part per million or more have been reported, and in 26 counties the recorded analyses show an average of 1.5 parts per million or more.

During the summer of 1944, the authors conducted detailed dental surveys in a region of endemic fluorosis, and in three State-controlled custodial institutions for children. The population studied was limited to subjects who were 13 years old or older. The dental findings have been analyzed not only in terms of place of residence and the regional content of fluoride in the domestic water

From the Department of Pediatrics, College of Medicine, and the Division of Pedodontics, College of Dentistry, State University of Iowa.

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supplies, but also on the basis of whether or not mottling of enamel was evident. Dental data have been expressed in terms of the number of surfaces of permanent teeth which have been affected by decay. The analysis has been made in terms of the frequency distribution of caries scores among the members of the groups as well as the average values for caries incidence. Included were counts of the number of *Lactobacillus acidophilus* organisms in the saliva of individual subjects. The results of the analysis of data indicate a significant inverse relationship between the incidence and extent of caries and the presence of mottling, but the distinction between the contrasted groups is not great: The ratio is approximately as 3:4, in favor of those children with mottled enamel. The average caries score of the subjects without mottled enamel was notably high, similar to that of the average child population elsewhere. Moreover, there is no evidence from the data obtained that the posteruptive ingestion of fluoride-containing water has lessened the caries incidence in the subjects examined.

PRESENTATION OF DATA

This study represents part of a larger program, designed to obtain accurate and detailed records of the dental status of teen-aged Iowa children, and to relate the dental findings to definable constants or variables in the environment. In this report consideration is limited to the manner in which dental caries was associated with the presence or absence of mottled enamel, and with the opportunity for current and for past ingestion of fluorine-containing water.

The three custodial institutions studied included two large orphanages and an industrial school for boys. None of the domestic water supplies in these institutions provides more than a trace of fluoride. The fourth center of study was the high school population of Ankeny, Iowa. Ankeny is a town of about 800 inhabitants situated in Polk County, about eight miles north of Des Moines. Polk County water tends to be high in fluorine content. From the records of the State Department of Health and the State Geological Survey,[8] fluorine values for 64 Polk County wells are available. Practically none of the domestic wells reported were free from fluoride; the median value recorded was 2.0 parts per million. Twenty rural wells within a radius of eight miles from Ankeny gave fluorine values ranging from 0 to 6.4 parts per million. Even the wells of less than 100 feet depth gave an average value of 0.9 part per million. Prior to 1936, the public water supply of Ankeny contained from 6 to 7 parts per million of fluorine, and mottling of enamel was prevalent among children who received such water during the time of the formation of the crowns of their permanent teeth. Since 1936, those wells have not been used; new wells have provided water with 0.8 to 1 part per million of fluorine.

To give full meaning to this study, one should know the specific fluoride intake for each subject from birth to the time of his dental examination. This has not been uniformly possible. For the institutionalized children we were able to learn from the official records how long each child had been resident in the institution; nothing was learned of the earlier life of these subjects. Many of these children, however, came from regions where fluorosis is encountered; about one-third of the institution subjects had mottled enamel. Each of the

Ankeny subjects was questioned at the time of his dental examination in regard to his earlier residence and this information has been supplemented through questionnaires sent to each child's home. For some rural Ankeny children we have evidence that the water supply has been constant since birth, that mottling is demonstrable, and have data as to the fluorine content of the specific water supply. Other children are known to have used only the public water supply in Ankeny since birth. Some children whose early life was spent elsewhere than in the Ankeny region have mottled enamel, and are known to have been reared in other areas of recognizedly significant fluoride supply.

The examining team comprised a dentist and a clerk. The dentist* had been specially trained in the technique of examination desired, and had a particular interest in the recognition of stains and of mottling. Each dental examination was detailed and exacting, and required from fifteen to twenty-five minutes for its completion and recording. The dental record provided data as to the status of each tooth space and each tooth surface, not only of the presence of decay but also of the approximate extent of each dental lesion.

The subjects whose records are used in this report were 210 boys and 98 girls. All subjects younger than 163 months (13½ years) were omitted from consideration. The average age was 15 years, 9 months. The distribution of subjects in each age group and from each zone of study is shown in Table I.

TABLE I. DEFINITION OF SUBJECT PERSONNEL

	NUMBER OF SUBJECTS													AVERAGE AGE OF SUBJECTS (MO.)
	BOYS					GIRLS					TOTAL			
SOURCE OF SUBJECTS / AGE:	14	15	16	17	18+	14	15	16	17	18+	BOYS	GIRLS	ALL	
State custodial institution 1	10	8	5	3	3	6	9	5	5	6	29	31	60	188
State custodial institution 2	6	16	20	25	21						88	0	88	198
State custodial institution 3	22	17	5	1	2	6	8	6	6	2	47	28	75	187
Subtotal	38	41	30	29	26	12	17	11	11	8	164	59	223	191
High school students from Ankeny, Iowa	7	14	12	11	2	9	14	11	4	1	46	39	85	187
Totals	45	55	42	40	28	21	31	22	15	9	210	98	308	190

Table II shows the duration of residence of the subjects in the specific regions studied. Of the institutionalized children, the boys from the industrial school had the shortest average tenure. Furthermore, practically without exception these boys had reached their teens before commitment, and as a group represented a less favored socioeconomic group than did the children from the orphanages. Of the Ankeny high school students, 25 had spent their entire lives in or near Ankeny; in all, 59 subjects had spent not less than five years of the immediate past in that locality. Only nine children were recent arrivals. Twenty-eight children had spent their first six years of life in the Ankeny region, and a total of 40 had spent at least two of their first six years there. Two-thirds

*Dr. Wah Leung, whose services were made available through the courtesy of Dr. Harold Hodge of the University of Rochester and the Carnegie Corporation.

TABLE II. RESIDENCE OF SUBJECTS AND COMMUNAL LEVELS OF FLUORINE IN WATER SUPPLIES

A. Children From State Custodial Institutions

PLACE OF RESIDENCE	DURATION OF SUCH RESIDENCE (YR.) AVERAGE M	F	TOTAL	MIDDLE 50% OF GROUP	FLUORINE CONTENT OF WATER SUPPLY (PPM.) FOR SPECIFIC RESIDENCE	FOR MUNICIPAL SUPPLY	FOR WHOLE COUNTY NUMBER OF ANALYSES	PPM. OF F AVERAGE	RANGE
State custodial institution 1	3.1	3.3	3.3	2-4	trace	trace	16	0.9	0-2.0
State custodial institution 2	2.4	0	2.0	2-3	trace	trace	17	0.4	0-2.0
State custodial institution 3	5.9	5.6	5.8	4-9	trace	trace	21	0.5	0-2.0

B. Ankeny High School Pupils in 1944

	NUMBER OF SUBJECTS M	F	TOTAL	FLUORINE CONTENT OF WATER SUPPLY (PPM.)	FOR MUNICIPAL SUPPLY	FOR WHOLE COUNTY NUMBER OF ANALYSES	PPM. OF F AVERAGE	RANGE
Duration of recent residence in Ankeny vicinity:								
5 years or longer	30	29	59					
2 years or longer	40	36	76	Since 1936	0.8-1.0	29	1.5	0-6.4
Less than 2 years	6	3	9					
Number resident in Ankeny vicinity during part of their first six years of life:								
5 years or longer	14	14	28					
2 years or longer	20	20	40	Prior to 1936	6-7	35	2.0	0-7.0
Less than 2 years	12	5	17					

of the Ankeny children had mottling of enamel. In two subjects the mottling was severe; in two others it was moderately severe; in the remaining subjects it was mild to moderate in degree.

Table II also summarizes the available information relating to the degree of prevalence of fluorine in the regional water supplies. From the prevalence and the levels of fluorine in the water from the Ankeny region, one is justified in the assumption that most children living in the Ankeny region have ingested significant amounts of fluorine during their respective periods of residence in that locality.

Table III relates to the dental findings of the subject personnel, in terms of their place of residence. The listing includes the incidence of mottled enamel, as well as the frequency and extent of tooth decay. Caries incidence is expressed in terms of the number of decayed, missing or filled tooth surfaces (DMF surfaces). Extracted teeth were scored as equivalent to three affected surfaces.

From Table III it will be noted that 36 per cent of the institutionalized children had mottled enamel, as compared with 62 per cent of the children from Ankeny. Caries in some degree was found in the mouth of practically

every child examined. Only four subjects were caries-free: two from the institutions and two from Ankeny. The average number of DMF surfaces among the institutionalized children was 12.5; for the Ankeny children the average was 11.4. The difference between the means for the institutional versus the Ankeny subjects is without statistical significance. The ratio between the number of affected surfaces and the number of affected teeth was not distinctive for the two groups of children: 1.45 versus 1.5. The incidence of extracted teeth was uniformly low (an average of 0.15 extracted teeth for each child) for the subjects from Ankeny and from the two orphanages. In contrast, the incidence of extractions among the boys from the industrial school was high: an average of 0.9 extracted teeth for each subject. This difference probably is explainable on the basis of socioeconomic distinctions, as previously mentioned. These subjects already were in their teens when committed, and their earlier dental needs had been met through extraction rather than through reparative dental measures. Klein and Palmer[11] have noted correlation between the incidence of extractions and the degree of socioeconomic handicap.

TABLE III. SUMMARY OF DENTAL FINDINGS

AGE	14	15	16	17	18+	BOYS	GIRLS	ALL
A. Children Living in State Custodial Institutions								
Number of subjects	50	58	41	40	34	164	59	223
DMF surfaces: total	420	665	480	646	576	2098	689	2787
Average per child						12.8	11.6	12.5
Ratio of DMF surfaces to DMF teeth						1.5	1.35	1.45
Extracted teeth: number	11	18	15	11	44	85	14	99
Subjects with no caries	2	0	0	0	0	2	0	2
Incidence of mottled enamel:								
Number of subjects						52	28	80
Percentage of group						32%	47%	36%
B. Children From Ankeny High School								
Number of subjects	16	28	23	15	3	46	39	85
DMF surfaces: total	174	355	209	198	32	518	450	968
Average per child						11.2	11.5	11.4
Ratio of DMF surfaces to DMF teeth						1.5	1.5	1.5
Extracted teeth: number	3	1	0	9	0	3	10	13
Subjects with no caries	0	0	0	2	0	2	0	2
Incidence of mottled enamel:								
Number of subjects						28	25	53
Percentage of group						61%	64%	62%

TABLE IV. COMPARISON OF DENTAL FINDINGS IN TERMS OF THE PRESENCE OR ABSENCE OF MOTTLED ENAMEL IN EACH SUBJECT'S MOUTH

	MOTTLING PRESENT			MOTTLING ABSENT		
GROUP OF SUBJECTS:	ANKENY SCHOOL CHILDREN	INSTITUTIONALIZED CHILDREN	TOTAL WITH MOTTLING	ANKENY SCHOOL CHILDREN	INSTITUTIONALIZED CHILDREN	TOTAL WITH NO MOTTLING
Number in group	50	77	127	35	146	181
DMF surfaces:						
Median value	9	10	10	15	12	15
Middle one-half of range	4-12	5-16	5-14	7-23	7-19	8-18
Mean	9.0	11.1	10.2	14.9	14.0	14.2
S. D.	5.8	7.8	6.9	9.6	9.25	9.6
S. E. mean	0.905	0.910	0.61	1.29	0.88	0.71
Average age, months:						
Boys			181			175
Girls			183			177

Table IV was prepared by rearranging the data used in Table III, to contrast the caries experience of children with and without mottling of the enamel, and to correlate caries scores in these subgroups with their place of residence. No sex distinction is made in Table IV, inasmuch as no significant sex difference was noted in caries scores. Note that the average DMF score for children with mottled enamel was 10.2 affected surfaces, as compared with 14.2 for children with no apparent mottling. The difference between these means is highly significant. Obviously mottling in these children is associated with a distinct lessening of average caries incidence. Moreover, the same trend was evident in each of the residential groups. It is of interest that the DMF score for the children with no apparent mottling is identical with the value reported for Hagerstown children of the same age by Klein, Palmer, and Knutson.[10]

One might object that the DMF score may not portray the actual extent of caries, because it does not take into consideration the extent of decay in the individual affected surfaces. To determine whether fluorosis led to lessened extent as well as lessened incidence of caries, we have devised a weighted DMF score for each child. This was done by multiplying the number of affected tooth surfaces by an arbitrary coefficient, based on the amount of tooth surface involved by caries. For lesions involving less than ¼ of the surface, the coefficient was 1; if less than ½, the coefficient was 2; if less than ¾, the coefficient was 3; if more than ¾ of the surface had been attacked, the coefficient was 4. Extracted teeth were given a weighted value of 12. Using this method of appraisal, then determining the ratio between the respective weighted and unweighted DMF values, no significant difference could be demonstrated between the extent of carious lesions in those with and without mottling of enamel. The average ratios between the weighted and the unweighted scores in the various residential areas for those with and without mottling ranged from 1.84 to 2.54. For the institutions collectively, such ratios for those with and without mottling were 2.3 and 2.3, respectively; for the Ankeny group the corresponding ratios were 2.24 and 2.42, with the unweighted scores considered as unity.

The total average reduction of caries incidence and extent observed in those with mottling, therefore, is expressed adequately by the unweighted values of DMF scores for the contrasted groups: those with mottling had 72 per cent as much caries as those with no mottling. Without question this is a desirable reduction, but it should be noted that the incidence of caries was considerable, even among those with mottling. One-half of the group with mottling had 10 or more DMF surfaces, and one-fourth of that group had more than 14 affected surfaces. Moreover, among the Ankeny subjects, those without mottling had a significantly higher range of DMF values than did the subjects from the custodial institutions who were currently receiving a low fluoride intake.

Students of the effect of fluoride ingestion on the lessening of caries have emphasized particularly the diminution of caries of the anterior teeth.[3] In Table V we have summarized the incidence of carious surfaces in the twelve anterior teeth and in the first molars, the average incidence of each and the proportion which each bears to the total number of DMF surfaces. It will be noted that the number of DMF surfaces in first molar teeth bore an essentially

constant relationship to the total number of DMF lesions, regardless of the geographic subgroup or the presence or absence of mottling. A similar constancy of relationship obtained for caries of the anterior teeth, when the Ankeny subjects were considered separately. Among the institution subjects, however, the incidence of anterior caries was negligible and the average extent minimal among those with mottled enamel, in contrast to notable incidence and extent of anterior caries among those with no mottling. In searching for an explanation of the difference in this regard between the Ankeny and the institution subjects, one must consider the possibility that some areas of enamel dystrophy in the teeth of the Ankeny children may have undergone distintegration, or that fillings may have been placed in some such areas for esthetic reasons.

TABLE V. DISTRIBUTION OF CARIOUS LESIONS BETWEEN ANTERIOR AND POSTERIOR TEETH

	SUBJECTS FROM STATE INSTITUTIONS		SUBJECTS FROM ANKENY HIGH SCHOOL	
	MOTTLING PRESENT	MOTTLING ABSENT	MOTTLING PRESENT	MOTTLING ABSENT
Total number of subjects	77	146	50	35
Proportion of subjects who had caries in anterior teeth	13%	89%	52%	54%
Number of subjects with caries of anterior teeth	10	130	26	19
Total number of DMF surfaces in anterior teeth	18	474	70	51
Average number of anterior DMF surfaces for each subject having anterior caries	1.8	3.6	2.7	2.7
Number of DMF surfaces in all teeth	1,065	2,489	446	522
Percentage of DMF surfaces found in anterior teeth	2%	19%	16%	10%
Total number of DMF surfaces in first permanent molars	556	1,160	209	231
Average number of first molar DMF surfaces for each subject	7.2	8.0	4.2	6.6
Percentage of DMF surfaces found in first permanent molars	48%	47%	47%	44%
Percentage of DMF surfaces found in other posterior teeth (by difference)	50%	34%	37%	44%

The values for anterior caries may be compared with the values found by Knutson, Klein, and Palmer[9] for the elementary school children of Hagerstown. In these children, who ranged in age from 6 to 15 years, caries of the twelve anterior permanent teeth accounted for 10 per cent of all DMF surfaces, and lesions of the first permanent molars accounted for 78 per cent of the total. Obviously direct comparison between these values and the ones herein reported cannot be made, because different values would be expected if Knutson, Klein, and Palmer's values were limited to children in their teen years.

In view of the prevalent opinion that the salivary content of *L. acidophilus* may serve as an index of caries activity or may relate to the rate of caries progression, it seemed worth while to learn whether parallelism could be demonstrated between the *L. acidophilus* counts of these subjects and the presence or absence of mottled enamel. The data are presented in Table VI. At the occasion of the dental examination, saliva samples were collected and these were analyzed by the bacteriologic division of the State Hygienic Laboratories by a

TABLE VI. COMPARISON OF RANGE OF LACTOBACILLUS ACIDOPHILUS COUNTS FROM SALIVA IN TERMS OF THE PRESENCE OR ABSENCE OF MOTTLED ENAMEL IN EACH SUBJECT'S MOUTH

GROUP OF SUBJECTS	MOTTLING PRESENT		MOTTLING ABSENT	
	ANKENY SCHOOL CHILDREN	INSTITUTIONALIZED CHILDREN	ANKENY SCHOOL CHILDREN	INSTITUTIONALIZED CHILDREN
Number of subjects tested	44	57	26	135
L. acidophilus counts:				
Median	1,000	0	13,000	1,000
Middle one-half of range	0 to 10,000	0 to 20,000	0 to 715,000	0 to 30,000
Total range (millions)	0 to 2.7	0 to 3	0 to 1	0 to 2
Percentage of group with counts of less than 500	50%	56%	42%	46%
Percentage of group with counts exceeding 30,000	30%	26%	38%	24%

technician especially trained to provide that service to the dental profession of the state.

In Table VI distinction has been made between those children whose saliva was free or practically free from *L. acidophilus* (500 organisms or fewer) and those who had many organisms (30,000 or more per cubic centimeters of saliva). Cross-comparison is made between the counts of those with and without mottling, and for those living in a region where current ingestion of significant amounts of fluoride is predictable versus those living in a low fluoride region. From the table it will be noted that little difference is apparent between the contrasted groups; and that if significance is to be ascribed to the differences, the Ankeny group must be considered to have higher counts than do the children from the institutions. There is nothing to indicate that either mottling of enamel or current ingestion of fluoride has, in itself, served to lessen the number of *L. acidophilus* organisms in the saliva.

SUMMARY AND CONCLUSIONS

The data from this study support the thesis that the incidence of dental caries is lessened in areas of endemic fluorosis. The findings differ sharply from several reported studies in their quantitative aspects. We found caries of some degree in almost every subject; in many children with mottled enamel and with prolonged fluoride ingestion the incidence of carious tooth surfaces was high. Further, there was no evidence to indicate that the current consumption of water containing submottling amounts of fluoride had lessened caries progress in children whose enamel was free from mottling.

Valuable knowledge will be gained from well-controlled serial studies of caries progression rates in individual subjects, in regions where the concentration of fluorine in domestic water supplies approaches the mottling level. Such studies will be equally valuable whether the fluorine occurs naturally or whether it has been added as an experimental or presumably therapeutic measure. The constancy of therapeutic value remains to be demonstrated, especially as it relates to teeth already erupted. The finding of nonconcordant results in different communities with similar fluoride ingestion makes prediction of results of such studies undependable.

There is no need to conclude from studies thus far reported that teeth undergo decay *primarily* because of inadequacy of fluoride ingestion, or because of lack of fluorine in the physicochemical structure of the tooth. Fluorinization remains a pharmacologic, not a physiologic method for the control of caries. These points should be borne in mind in the conduct of fluorine studies. The ultimate answer to caries control probably will lie in the furtherance of innate physiologic protective agencies rather than through pharmacologic procedures.

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WILMS' TUMOR

A Review of Sixteen Cases

Reed M. Nesbit, M.D., and Frederick M. Adams, M.D.
Ann Arbor, Mich.

ALL OF the published reports of Wilms' tumors in childhood give a rather poor or hopeless prognosis. The largest reported series is that of Ladd and White[1] in which they had sixty operative cases with fourteen children living at least two years postoperatively, a survival rate of 23.3 per cent. Priestly[2] reported thirty-nine operated cases with six survivals, a survival rate of 15.4 per cent. Kretschmer[3] had twenty-seven pathologically proved cases, twenty-five of whom were operated upon with three survivals, a survival rate of 12 per cent. All other reports give similar statistics of a rather high mortality rate with Ladd and White's series having the highest survival rate.

We wish to report a series of sixteen cases of Wilms' tumor that were treated at the University of Michigan Hospital during the nine-year period from Jan. 1, 1934, to Jan. 1, 1943. Eight of these sixteen children are still living, all of them at least three and one-half years since the institution of treatment.

The Wilms' tumor, adenomyofibrosarcoma or embryonal mixed tumor of the kidney, is the most common renal neoplasm occurring in childhood. Ewing[4] states that the great majority of these tumors occur in the first three years of life and seldom after the tenth year. The present series of cases bears out this observation, for twelve of the patients were under 3 years of age, and fifteen of the sixteen were under 6 years of age. The youngest patient in the group was 6 months old at the time of diagnosis.

It is usually stated that there is no sex predominance in these cases. In our series, eight occurred in females and eight in males.

It is well agreed by most authors that this peculiar neoplasm is a developmental tumor. This has been clearly shown by studies of the embryological anlage of the kidney. The epithelium of the urinary tract is derived from the mesodermal intermediate cell mass, and the convoluted tubules arise from the undifferentiated mesenchyma which appears like cellular connective tissue in which glandular elements are formed. These tissues are similar to the pathologic picture observed in a typical Wilms' tumor; a variety of cell types of the epithelial or connective tissue group. There are usually found within the same tumor acinar or adenomatous cells, sarcomatous tissue, smooth muscle, connective tissue, vascular tissues, and occasionally cartilage, and even bone.

Three of our cases did not entirely conform with the usual pathologic picture. Two of them were diagnosed as adenocarcinomas, one of which might have been a variant of a Wilms' tumor. The third was diagnosed as a tera-

toma. We feel that these patients should be included in this series, for clinically they were indistinguishable from a typical Wilms' tumor. Furthermore, as Kretschmer has pointed out, if complete histologic studies are carried out on these tumors, all of the characteristic cell types will usually be found.

SYMPTOMATOLOGY

Except in rare instances these tumors develop silently and their discovery almost invariably is made by the mother or nurse who notices the presence of an abnormal mass in the abdomen of the infant. Hematuria is rare and tends to occur late in the course of the disease. Likewise fever, weight loss, and abdominal pain tend to occur only in those patients who have large tumors or tumors of long standing. For the most part, if the child has intelligent and observant parents who discover the tumor early and seek medical advice at once, the patient, when first seen, will be a well-developed and well-nourished child. The symptoms of our patients are enumerated in Table I. We believe that it is significant that the symptoms of weight loss, pallor, vomiting, and abdominal pain occurred only in the cases where there was a delay in seeking medical attention. Therefore, it can be said that in a large majority of the cases of Wilms' tumor, the first noticeable symptom is that of a painless progressive enlargement of the abdomen, and that other symptoms and signs are most often associated with advanced stages of the disease.

TABLE I

SYMPTOMATOLOGY	
Palpable tumor	16
Fever	6
Abdominal pain	9
Loss of weight	4
Hematuria	2
Frequency	4
Vomiting	4
Irritability	4
Pallor	2

DIAGNOSIS

The diagnosis of a Wilms' tumor is not difficult for the physician to make. In a child, usually under 5 years of age, with a history of progressive enlargement of the abdomen and with the finding on physical examination of a firm, nontender, smooth or finely nodular mass which usually fills one-half the abdomen one can quickly make the presumptive diagnosis of a Wilms' tumor. The second most common abdominal tumor in childhood and one which gives the most difficulty in the differential diagnosis is the sympathoblastoma, or neuroblastoma, of the adrenal. Other abdominal masses or tumors that are occasionally seen and must be considered in the differential diagnosis are retroperitoneal sarcoma, leucemic infiltrations of liver and spleen, hydronephrosis, polycystic kidneys, mesenteric cyst, ovarian cyst or neoplasm, tuberculous peritonitis, and fecal impactions.

The diagnosis is usually established by pyelography. Subcutaneous or intravenous injection of diodrast is quite simple and in many instances satis-

factory results are obtained. The use of retrograde pyelography is restricted almost entirely to females because it is a particularly traumatic procedure in male infants. Furthermore, such a procedure requires a general anesthetic and therefore, either subcutaneous or intravenous pyelograms are first attempted. If unsuccessful, and if it is felt that pyelograms are necessary for the diagnosis, the retrograde method is used.

Fig. 1.—Intravenous pyelogram showing distortion of the right kidney pelvis and calices and displacement of the ureter by the tumor mass.

The so-called characteristic pyelographic changes seen in a Wilms' tumor are: (1) distortion of the renal pelvis and calices, (2) displacement of renal pelvis upward, downward, or lateralward, depending on the position of the tumor within the kidney, and (3) failure of visualization of the kidney pelvis. However, it should be remembered that these described changes are not absolutely diagnostic, but merely suggestive of a Wilms' tumor. When no contrast medium can be seen in the pelvis or calices on the affected side, the diagnostician must think of hydronephrosis as well as neoplasm. Twice during the past fifteen years our surgeons have found massive hydronephrosis to be the condition responsible for large renal tumor masses that were operated upon with the presumptive diagnosis of Wilms' tumor.

A procedure formerly used as an aid in the diagnosis but now thrown into discard, is that of aspiration biopsy. It is felt that the risk of setting malignant cells free into the peritoneal cavity as metastatic sites does not

warrant this procedure being carried out. Furthermore, too often the material aspirated is either normal kidney tissue or if there are tumor cells present they are not representative enough to make a clear-cut diagnosis.

Fig. 2.—Retrograde pyelogram showing typical distortion of the right kidney, pelvis and calices in a Wilms' tumor. Note the complete displacement of the right kidney into the left half of the abdomen by the tumor mass.

TREATMENT

Although most authors agree that irradiation and surgical removal of the tumor is the treatment of choice, there is no unanimity of opinion. Ladd and White,[1] in giving an excellent discussion of preoperative irradiation, came to the conclusion that the chance of survival is greater if a policy of immediate nephrectomy is adopted rather than waiting for preoperative irradiation shrinkage of the tumor. Priestly and Broders,[5] on the other hand, took the more widely accepted view that both preoperative and postoperative irradiation is desirable. They recommended surgical removal of the tumor four to six weeks after the institution of irradiation therapy. Postoperative irradiation, in their opinion, should be given over the entire abdomen and thorax. Our series of cases is small and the fact that the treatment has varied from patient to patient makes it impossible for use to draw any conclusions

as to what is the proper form of therapy. However, in recent years we have adopted the following policy in treating these patients: preoperative irradiation is reserved for those cases in which the tumor is so large that operative removal would be technically very difficult, thus minimizing the chances for survival. This naturally means that the majority of the patients receive preoperative irradiation, for, as has already been pointed out, the outstanding feature of this tumor is the enormous size to which it grows before giving rise to any symptoms. Occasionally, however, we do see a patient in which the abdominal enlargement has been noted early and the tumor has not reached

Fig. 3.—Retrograde pyelogram showing downward displacement and distortion of the left kidney pelvis and calices.

tremendous proportions, thus making safe surgical procedure feasible. On this type of patient preoperative irradiation is dispensed with and nephrectomy is carried out immediately. Postoperative irradiation was formerly employed only in those patients in whom regional metastases were grossly evident at the time of operation, or if pathologic study of the regional lymph nodes showed metastatic involvement. However, we have now adopted the policy of giving all patients postoperative irradiation. We have made this change in policy because three of the eight living patients very definitely owe their survival to irradiation therapy. As such, we now feel that every patient should have the benefit of possible lifesaving postoperative irradiation.

In view of possible errors in diagnosis, we have operated upon all tumors of the kidney, regardless of size or evidences of local fixation, provided the chest is free from roentgen evidences of metastases. As previously noted, massive hydronephrosis was encountered in two such instances. In each case preoperative irradiation had failed to shrink the tumor mass and operation was performed with the avowed hope that an error in diagnosis would be thereby disclosed.

OPERATIVE TECHNIQUE

The technique of operation that has been employed in all of our cases has consisted of the standard oblique flank incision extended rather long anteriorly to permit opening the peritoneum for the purpose of exploration for local extension of the neoplasm. It is of interest in this connection that one of the survivors in the present series of cases (eleven-year survival) had peritoneal infiltration from the upper pole of the neoplasm that necessitated the excision of an area of peritoneum 4 by 4 inches in diameter along with the tumor. We have routinely approached the pedicle of the kidney from the back, having never developed a satisfactory technique of transperitoneal approach to this structure. Hilar lymph nodes are removed for biopsy when adenopathy is observed.

RESULTS OF TREATMENT

Our series consists of sixteen patients in whom the diagnosis of a Wilms' tumor was confirmed by pathologic study. Of these sixteen children, eight are still living for a period of time ranging from three and one-half to eleven and one-half years since the institution of treatment. Table II summarizes the treatment of the eight survivals.

TABLE II. SURVIVALS

PATIENT	SEX	AGE	TREATMENT	SURVIVAL (YR.)
1	M	5 yr.	Nephrectomy	11½
2	M	4 yr.	Nephrectomy	11
3	F	3 yr.	Nephrectomy; postoperative irradiation	11
4	F	3 yr.	Irradiation	10
5	F	2 yr.	Preoperative irradiation; nephrectomy	8½
6	F	10 mo.	Preoperative irradiation; nephrectomy	8
7	M	4 yr.	Nephrectomy; postoperative irradiation	4
8	F	10 mo.	Nephrectomy	3½

It is of particular interest to note that of the eight children apparently cured, only seven had nephrectomies. The survivor who was not operated upon was first seen here in 1933, at the age of 14 months with idiopathic hydrocephalus. She was next seen in March, 1935, with the new complaint of abdominal enlargement; the hydrocephalus had since become arrested. Physical examination at that time revealed a huge finely nodular mass occupying the entire right half of the abdomen. An intravenous pyelogram failed to show any visualization of the right renal pelvis. An aspiration punch biopsy was sufficiently diagnostic to make a clear-cut diagnosis of Wilms' tumor. Chest x-rays showed a right pleural effusion interpreted as being due to meta-

static lesions in the lung. Therefore, the tumor was considered to be inoperable and she was given palliative irradiation therapy over the right abdomen and right chest. She received a total of 1,800 r. in divided doses over a period of two weeks' time. She was not seen again until 1939, when an examination revealed no evidence of any abdominal mass and the chest was clear by x-ray. She was last examined by us in October, 1945, and was free from evidences of neoplasm at that time, ten years following the original diagnosis. Another intravenous pyelogram done at this time still showed nonvisualization of the right kidney pelvis and normal visualization of the left kidney pelvis and calices. This must, therefore, be classified as a possible cure of an embryoma of the kidney by x-ray therapy alone.

Twelve of the sixteen patients had nephrectomies. Seven of these children have lived long enough postoperatively to be considered cures by the standards set up by most authors.

Two of these patients, at operation, had gross evidence of retroperitoneal extension of the tumor. They were given postoperative irradiation and the fact that they are still living shows adequately the value of this procedure.

With one exception, all of the five patients who had nephrectomies and that have since died, showed evidence of metastases within six months postoperatively. However, the one exception lived three and one-half years before showing recurrence of the tumor. This child should be kept in mind when evaluating postoperative survival statistics.

Operation was denied four of the sixteen patients, either because of pulmonary metastases, or because they were in such poor condition that they were considered hopeless operative risks. One of these has already been discussed, the child who has survived ten years following x-ray therapy alone. All the remaining three patients in this group had a typical history and physical findings of a Wilms' tumor, and the pathologic study was made by punch biopsy. These three died within five months from the time they were first seen here.

Throughout this same nine-year period there was a total of twenty-seven cases observed, upon which a presumptive clinical diagnosis of Wilms' tumor was made, but of this group only the herein discussed sixteen patients had the diagnosis confirmed by microscopic examination. The remaining eleven had no pathologic diagnosis made for various reasons. Five of them had a large abdominal tumor with distortion of the renal pelvis by pyelography, but had metastatic lesions in the lungs by x-ray and were therefore deemed inoperable. These five patients received palliative x-ray therapy and all subsequently died. Two patients had clinical evidence of a Wilms' tumor and operation was advised but was refused by the parents. Both of these children are dead. Three children had the presumptive diagnosis made here, but were operated on elsewhere and we were unable to obtain pathologic material from these tumors for study. Two of these patients are still living and well, seven years and five years postoperatively. The eleventh patient was seen in 1934, and the tumor was said to be too large for operative removal. We do not feel

TABLE III. WILMS' TUMOR

PATIENT	AGE	SEX	DATE	CHIEF COMPLAINT	TREATMENT			COURSE	PATHOLOGY	COMMENT
					PREOPERATIVE IRRADIATION	NEPHRECTOMY	POSTOPERATIVE IRRADIATION			
S. V.	5 yr.	M	1/29/34	Abdominal pain	0	2/ 2/34	0	Alive 11½ yr.	Operative specimen Wilms' tumor	
D. M.	4 yr.	M	7/26/34	Bloody urine	0	8/ 1/34	0	Alive 11 yr.	Operative specimen adenocarcinoma	
A. H.	3 yr.	F	8/16/34	Large abdomen	0	9/ 5/34	Yes	Alive 11 yr.	Operative specimen Wilms' tumor	At operation retroperitoneal infiltration from superior pole of tumor
N. B.	10 yr.	F	10/ 9/34	Large abdomen	0	10/13/34	Yes	Dead 1/10/34 27 mo.	Operative specimen adenocarcinoma ? variant Wilms'	At operation peritoneal attachment; 6 mo. postoperative chest metastasis by x-ray
D. C.	6 mo.	M	12/ 3/34	Abdominal mass	0	0	0	Dead 1/5/35 1 mo.	Punch biopsy Wilms' tumor	Inoperable because of poor condition of patient
S. B.	3 yr.	F	3/ 4/35	Abdominal growth	Yes	0	0	Alive 10 yr.	Punch biopsy Wilms' tumor	Inoperable because of chest metastases, therefore only given irradiation
B. G.	3 yr.	F	3/29/35	Large abdomen	Yes	0	0	Dead 5/24/35 2 mo.	Autopsy Wilms' tumor	Inoperable abdominal metastases
J. N.	21 mo.	M	5/11/35	Abdominal "swelling"	Yes	6/ 6/35	0	Dead 3/20/40 4 yr. 9 mo.	Operative specimen Wilms' tumor	In good condition for 3½ yr. postoperative, then abdominal metastases found
H. F.	14 mo.	M	1/24/36	Abdominal tumor	Yes	2/28/36	Yes	Dead 7/26/36	Operative specimen Wilms' tumor	At operation retroperitoneal extension
J. B.	2 yr.	F	2/15/36	Large abdomen	Yes	4/13/36	0	Alive 8 yr.	Operative specimen Wilms' tumor	
D. S.	15 mo.	M	6/ 3/36	Abdominal mass	Yes	0	0	Dead 11/20/36 5 mo.	Punch biopsy Wilms' tumor	Inoperable because of poor condition of patient
S. G.	10 mo.	F	9/24/36	Abdominal tumor	Yes	12/30/36	0	Alive 8½ yr.	Operative specimen teratoma	
S. M.	4 yr.	M	11/24/40	Large abdomen	0	12/ 4/40	Yes	Alive 4 yr.	Operative specimen Wilms' tumor	At operation many large involved nodes left; classed as hopeless
S. P.	10 mo.	F	4/23/42	Large abdomen	0	5/ 7/42	0	Alive 3 yr.	Operative specimen Wilms' tumor	
T. G.	3 yr.	M	8/28/42	Abdominal mass	0	9/12/42	0	Dead 2/6/43 5 mo.	Operative specimen Wilms' tumor	
S. W.	3 yr.	F	12/ 7/42	Large abdomen	0	12/14/42	0	Dead 2/10/43 2 mo.	Operative specimen Wilms' tumor	Developed chest metastases two weeks after operation

that these patients should be included in a statistical analysis for they were never proved by pathologic study.

SUMMARY

1. A series of sixteen children with Wilms' tumor of the kidney is presented.

2. Twelve of the patients had nephrectomy and seven of these are alive, three and one-half to eleven and one-half years postoperatively, a survival rate of 58.4 per cent.

3. Two of the nephrectomized patients who had retroperitoneal infiltration with neoplasm and were given postoperative irradiation have survived four and eleven years without clinical evidences of recurrence.

4. One child, considered inoperable because of questionable chest metastases, was treated by x-ray alone. She has survived ten years and today appears well.

5. Thus, among the eight living patients in the present series it is our belief that three owe their survival to irradiation therapy and we are therefore inevitably led to the conclusion that postoperative irradiation is indicated in all patients.

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A DEVELOPMENTAL GRAPH FOR THE FIRST YEAR OF LIFE

C. Anderson Aldrich, M.D., and Mildred A. Norval, M.D.
Rochester, Minn.

THIS developmental graph is presented in the hope that it will help physicians to follow, with the minimal expenditure of time and effort, the neuromuscular growth of infants under their care and that these steps may be used as an index of the child's maturity.

Since growth follows a regular pattern, the sequence of the steps is established and progressive. This enables one to demonstrate to the mother, each time she comes for advice, what her child will be doing next in his progress.

While the sequence is rigid, each child has his own rate of growth, which reflects his own individuality as well as his maturity. However, the appearance of these emerging abilities may be modified somewhat by the effects of environment.

We followed the development of 215 normal infants from birth to the early part of their second year. The parents of these infants came from all strata of society in Rochester, Minn., which, however, has a larger proportion of professional people than is usual.

We explained to each mother how her infant's behavior would follow the sequence of growth and advised her to encourage her baby to use each ability as it appeared. Since we were to record the time of onset of these various accomplishments, this information was obtained by testing the infants at monthly intervals and instructing the mothers to watch for the achievements not so easily elicited in the clinic. The latter method is subject to the inaccuracy of lay observation but does allow the infant to be observed in his natural environment by an interested person.

The more evident steps in neuromuscular growth were chosen. Some of these have been used previously[1] to make parents conscious of the stereotyped progress of growth. The selected steps were:

1. Smile—the baby begins to smile in response to an adult or to his voice.
2. Vocal—the infant utters such sounds as "ah," "eh," and "uh" spontaneously or on stimulation.
3. Head control—when the infant is lifted by his hands from the supine to the sitting position, the head does not lag but is supported by the anterior muscles of the neck.
4. Hand control—when a toy is dangled in the midline above his chest, the infant is able to close in on the toy with one or both hands and to grasp it.
5. Roll—the baby makes a complete roll from back to abdomen.
6. Sit—the baby sits alone for several moments.
7. Crawl—the baby is able to move across the room or pen toward some distant object; this may be accomplished by rolling over and over, pushing

From the Rochester Child Health Project, and the Section on Pediatrics, Mayo Clinic.

himself along on his stomach or back, or by any individual modification of progression.

8. Prehension—this is the bringing together of the thumb and index finger to pick up a small object. This can be tested with a bright-colored button.

9. Pull up—the infant pulls himself to a standing position.

10. Walk with support—the infant walks by holding to his playpen, a piece of furniture, or an adult.

11. Stand alone—without any support, the infant stands for several moments.

12. Walk alone—the infant takes several steps alone.

While our records aimed to record the onset of these achievements in infancy, many of the statements in the literature indicate the age of achievement of the perfected act; hence, they will record a somewhat later age. In previous reports there is a wide variation in the number of infants observed, their selection, the methods of testing them, and the definition of the various levels of development.

It is generally stated that the first voluntary behavior is smiling in response to the mother's voice, which occurred in our series at the average age of 0.9 month. Chaillé[2] stated that after 3 weeks of age many babies begin to smile. Preyer[3] observed a smile on his son's face during the fourth week (0.9 month). Sixty per cent of babies smile socially at one month of age according to Linfert and Hierholzer,[4] while others have recorded this as an accomplishment at 1.4 months[5, 6] and at 2 months.[7-10]

Morgan and Morgan[9] found that one-half of the babies were cooing at 6 weeks (1.4 months), as was also found by Gesell, Thompson, and Amatruda,[6] and Bayley.[5] The average infant in our group uttered sounds, such as "uh" and "ah," at 1.7 months. Other authors[3, 7, 8, 11] have reported vocalization at 2 months.

When the infant is raised from the supine to the sitting position, the head will lag slightly at 12 weeks (2.8 months) according to Gesell and associates and at 16 weeks (3.7 months) according to Amatruda.[12] We found, on the average, the baby was able to control his head at 2.9 months. Other authors have stated that the head could be held erect and steady at 3 months,[2, 11] and at 4 months.[4]

Bühler[7] expressed the belief that the ability of the infant to reach for and grasp a toy is the best index of normal activity in a 4-month-old child. This is the age at which our average infant attained this achievement. Gesell[13] and Hetzer and Wolf[8] have observed reaching movements in infants at this age and stated that the infants may close in on the object and grasp it, while some[10, 14, 15] have seen this achievement first during the fifth month.

In our series the mothers first observed their infants to roll from back to stomach at an average age of 5.1 months, while Shinn[10] saw her niece do this at 24 weeks (5.5 months). Gesell[16] stated that a few infants may roll from back to stomach as early as 4 months but that this is a usual feat at 6 months. Bühler reported this ability at 6 months, Shirley[15] at 29 weeks (6.7 months), and Hetzer and Wolf at 7 months.

The average infant in our group was sitting alone for several minutes at 6.2 months. Sitting alone, at least briefly, has been reported at 25 weeks (5.8 months),[10] 6 months,[2, 14] and 7 months.[15, 15]

By many diverse means our average infant began "going places" on the floor at 7.3 months. Bühler[7] and others[2, 8] reported that infants are able to move toward a desired object at 7 months, while some consider crawling at 8 months[13] and 8.5 months[15] an achievement.

Our infants started to pick up objects with thumb and forefinger at an average age of 8.1 months. Gesell[13] stated that the 9-month-old infant can bring the thumb and forefinger together deftly in a plucking movement and that this movement is highly characteristic of that age. Bayley listed this as an accomplishment at 9.3 months.

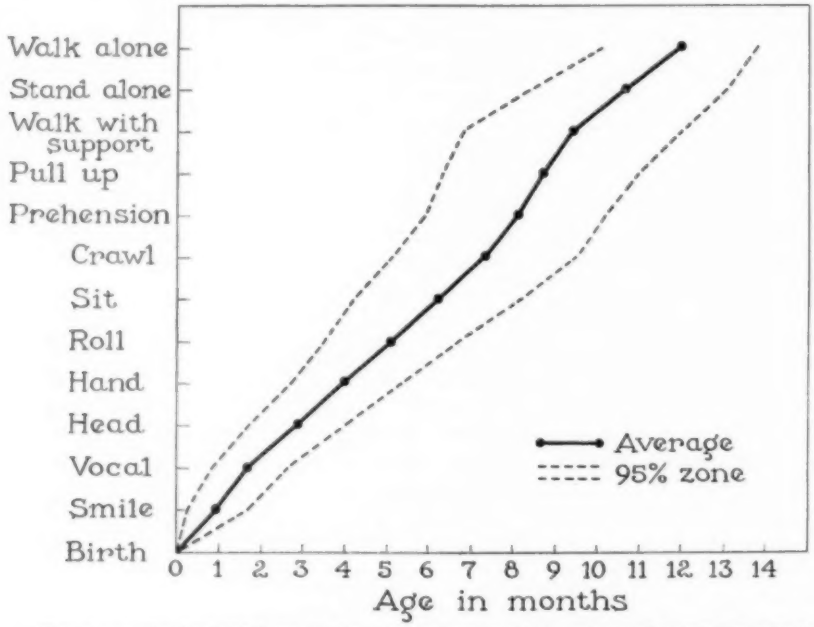

Fig. 1.—A developmental graph for the first year of life shows the average age for the achievements selected and the zone in which 95 per cent of the infants' developmental graphs fell.

Shinn reported that her niece pulled herself to a standing position at 33 weeks (7.6 months) and Bühler observed the first attempts of an infant to raise himself to a standing position at 8 months, while our infants did this at the average age of 8.7 months. Others have reported this at 9 months[2, 13] and 10 months.[8, 15]

Infants have been seen to walk with help at 9 months,[6, 7] 42 weeks (9.7 months),[15] and 49 weeks (11.3 months),[10] but Gesell[13] listed this as an achievement for those 12 months of age. The average child in our series walked with help at 9.5 months.

Shinn's niece stood alone on the three hundred and sixteenth day (10.4 months). Our average child was observed to stand alone for several moments at 10.7 months, but Gesell and Thompson have this as a momentary achievement in their age group at 56 weeks (12.9 months).

Our average child as well as Shinn's niece and Chaillé's group of children succeeded in walking alone at 12 months of age. Shirley expressed the belief that this may occur between 11.5 and 17.5 months, while 77 per cent of McGraw's[17] series were walking independently by 14 months and the median child of Gesell's[13] group walked at 15 months.

The average ages of these developmental steps are shown in Fig. 1. There was no difference between the rate of the boys and that of the girls. The course of the more rapidly developing infants and of the slower ones followed the average graph but at earlier and later ages, respectively.

Our results in this study show the age of walking alone to be accelerated about two months as compared with the generally accepted standards. Inasmuch as our group forms a fairly representative sampling of an average American city we find it hard to account for this discrepancy. It may be due to the fact that our mothers were instructed to foster rather than to oppose the steps of growth. Possibly the emotional freedom thus produced had an influence on the early postural achievements of the group.

SUMMARY

Twelve developmental steps of neuromuscular growth were chosen for study in an unselected group of 215 infants observed at a well baby clinic. Observations of the age of attainment of these steps were made and a graph depicting the average curve and the variation is presented. In our group walking alone appeared accelerated somewhat as compared with the generally accepted standard time.

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"VIRUS PNEUMONIA"

COMMANDER EDWARD C. CURNEN, M.D.

MEDICAL CORPS, UNITED STATES NAVAL RESERVE

THE much abused and inappropriate term virus pneumonia obviously denotes a form of pneumonia induced by a virus. A number of different viruses are in fact capable of causing pneumonia in birds and animals but may be harbored in susceptible species with or without apparent disease. Among these, viruses of the psittacosis-lymphogranuloma or ornithosis group are also capable of causing pneumonia in man.[1, 2] In many cases of pneumonia attributable to viruses included in this group, it is possible to trace the source of infection to birds such as parrots, parakeets, or pigeons. Although numerous instances of human ornithosis have been reported, the incidence of this variety of pneumonia in human beings is probably low.[2, 3, 4, 5]

Still other viruses, some of which are capable of causing pneumonia in animals, have been suspected to be causative also of pneumonia in man.[6] Among these are the viruses of influenza, lymphocytic choriomeningitis, and measles. In human infections with each of these agents symptoms referable to the respiratory tract are common. It remains to be established, however, whether in man the pneumonia which may occur during infection with any of these viruses is caused by the virus itself or results from the presence of some other agent which acts as a concomitant or secondary invader.

Certain rickettsial infections are also associated with pneumonia. Rickettsia burneti or diaporica is the causative agent of so-called Q fever, a form of pneumonia which was first recognized among meat handlers in Queensland, Australia, and has occurred in laboratory workers who have studied the agent. Reports concerning the occurrence, clinical manifestations, and etiology of Q fever have been reviewed recently.[6] It is debatable whether pneumonia which may occur in the course of other rickettsial infections of human beings is attributable directly to the rickettsiae.

It may be said of all of these agents, whether known or suspected to be capable of inducing pneumonia in human beings, that none of them was responsible for the vast majority of cases which have been grouped together as instances of so-called virus pneumonia.

Virus pneumonia, acute pneumonitis, or primary atypical pneumonia are a few of many terms used to designate an acute respiratory disease which during the past twelve years has become an increasingly familiar *clinical* syndrome. Early reports calling attention to this form of pneumonia were followed by numerous other publications which have been reviewed recently.[7-11]

From The United States Navy Research Unit at the Hospital of The Rockefeller Institute for Medical Research.

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The illness is usually characterized by a gradual onset, fever, cough, headache, relative bradycardia, evidence of pneumonia more apparent by x-ray than by physical examination, and a normal or only slightly elevated leucocyte count. Patients frequently develop in their serum cold agglutinins for human erythrocytes. Convalescence may be protracted, complications are uncommon, and the illness almost invariably is followed by complete recovery.

Although probably not a new disease, an increasing awareness of its occurrence during the past decade has suggested that this form of pneumonia may have increased in prevalence. In the Armed Forces during World War II, it was encountered more frequently than bacterial pneumonias. The illness has a widespread geographic distribution, affects all age groups but most frequently young adults, and occurs throughout the year, but especially in those seasons when colds and other undifferentiated forms of respiratory infections are most prevalent. Its scattered occurrence in communities where milder varieties of respiratory disease are current has been noted repeatedly and has suggested that this form of pneumonia may be a more severe manifestation of certain common respiratory infections of undetermined etiology. The results of epidemiological and experimental studies have provided some evidence in support of this view.[3, 12] It appears that the incubation period may vary from one to three weeks but is usually about two weeks.

The term primary atypical pneumonia although not unobjectionable has been useful in distinguishing this form of pneumonia from clinically similar illnesses attributable to known infectious agents including bacteria, fungi, rickettsiae, and viruses. Although primary atypical pneumonia is generally considered to be of nonbacterial origin, the failure to incriminate pathogenic bacteria does not warrant the assumption that the illness is therefore caused by a virus. Extensive and painstaking efforts to determine the causative agent have not as yet resulted in completely satisfactory conclusions. It is not possible here to review all of the studies of primary atypical pneumonia, but an effort will be made to present the salient clinical features of the illness and to indicate the present status of knowledge concerning the etiology of this syndrome.

The clinical manifestations of primary atypical pneumonia vary considerably in individual patients; those observed in 106 young adults studied at the Hospital of The Rockefeller Institute[4] are representative and similar to those described in other reports.

The onset of illness in approximately 75 per cent of patients is gradual and ill-defined. Initially the symptoms are frequently those of a cold or grippe. Malaise, fever, headache, and cough are common early complaints; chilly sensations may occur on more than one occasion, frank chills are exceptional. Coughing frequently accentuates substernal discomfort or pain; the sharp lateral chest pain so often associated with pleuritis is uncommon. The cough in this illness is usually dry at first, but in most instances, becomes productive of mucopurulent sputum, which may be copious, and may at times be blood-tinged. Rusty or frankly bloody sputum is only occasionally observed.

Fever is almost invariably present during the acute phase of illness, but the pulse and respiratory rates are generally normal or only slightly elevated,

a helpful feature in differentiating this disease from the common bacterial pneumonias. The patients usually do not appear as ill as the fever might lead one to expect. Abnormal pulmonary signs for the first few days are minimal or absent. Diminution of breath sounds over an affected area is often the first alteration noted. Scattered inconstant fine râles, and slight reduction in percussion resonance may follow. Later, during resolution, râles are more frequently heard and may be moist or coarse. The transmission of voice sounds is usually unaltered; signs of true consolidation are infrequent. Abnormal physical signs in the lungs when present may vary markedly within very short intervals. Râles may persist after x-ray evidence of pneumonia has disappeared. Except in the most severely ill patients, or for brief intervals associated with paroxysms of coughing, dyspnea and cyanosis are not seen.

X-ray films of the lungs usually reveal more extensive pulmonary involvement than would be anticipated from the results of physical examination and may provide the only objective evidence for making a diagnosis of pneumonia. The site of pneumonia is most frequently in the lower lobes with about the same incidence for each side. Consolidation in an upper or the middle lobe is usually, but not always associated with consolidation elsewhere. Involvement of more than one lobe occurs in approximately 50 per cent of patients.

Pulmonary lesions as viewed in x-ray films show extraordinary variations in density as well as distribution. In most instances consolidation first appears and is most dense at the hilum, spreading and becoming less dense toward the periphery of the lung. The affected areas are frequently mottled in appearance and the borders are usually irregular and ill-defined. Resolution occurs in several ways, but in most instances clearing proceeds from the periphery of the lung toward the hilum, sometimes leaving residual accentuation of the bronchovascular markings of questionable significance.

Only rarely is the density or extent of pulmonary consolidation in a given lobe comparable to that seen in characteristic films of patients with lobar pneumonia. Infiltration radiating from the hilum and involvement of an upper lobe may resemble tuberculous lesions, and, occasionally, the presence of small abscess cavities is suggested. Other shadows, especially in the lower lobes, may arouse a suspicion of bronchiectasis. The relative rapidity with which abnormal x-ray findings usually disappear is of particular value in excluding a diagnosis of chronic pulmonary disease. It should be emphasized, however, that a diagnosis of primary atypical pneumonia cannot be made on the basis of x-ray evidence exclusively, but only in conjunction with other findings, both clinical and laboratory.

The leucocyte count on admission and at intervals thereafter is usually normal or only slightly elevated. This is another helpful feature in distinguishing primary atypical pneumonia from the bacterial pneumonias in which leucocytosis characteristically occurs. Elevation of the erythrocyte sedimentation rate is usual in the acute phase of illness and persists on the average for four weeks. Electrocardiograms, urinanalyses, and biochemical assays of blood and urine usually reveal no significant abnormalities.

Cultures of the blood show no bacterial growth. The bacterial species found in ordinary examinations and cultures of the nose, throat, and sputum are generally similar to those encountered in the respiratory passages of normal human beings.

Sera obtained from patients studied at the Hospital of The Rockefeller Institute[4] were tested for the presence of antibodies against viruses known or thought to be capable of inducing respiratory disease in man. These included influenza A, influenza B, and swine influenza viruses, as well as the viruses of psittacosis and lymphocytic choriomeningitis. The results indicated conclusively that none of these viruses was causally related to primary atypical pneumonia in the group of patients studied.

In the course of these investigations it was found that certain patients with primary atypical pneumonia develop in their serum the capacity to fix complement with a variety of apparently unrelated antigens prepared from normal or infected tissues of several different species.[13] This observation is pertinent in interpreting the results of complement fixation tests with serum from patients with atypical pneumonia.

The course of the illness is extremely variable. In the series already cited[4] all of the patients recovered. The average duration of fever was 10 days and of pneumonia, on the basis of physical signs, 13 days with a range of 0 to 41 days in both categories. The average duration of pneumonia as determined by serial x-ray films was 14 days with a range of 3 to 41 days. Complications were infrequent and usually not severe. These included pleuritis, sinusitis, otitis media, and stomatitis. The development of bronchiectasis following atypical pneumonia has been reported.[14] The general incidence of fatalities has averaged considerably less than 1 per cent.

The treatment of primary atypical pneumonia does not differ from the symptomatic and supportive therapy commonly used in other forms of pneumonia. Alleviation of headache and measures to relieve cough without entirely suppressing it are usually the chief requirements. Treatment with either sulfonamide drugs or penicillin has not been found to be effective.

The published reports on the occurrence of cold hemagglutinins in primary atypical pneumonia have been reviewed recently.[15] All investigators of this phenomenon are in agreement that during the course of this illness numerous patients develop in their serum the capacity to agglutinate human erythrocytes in the cold. Maximum cold hemagglutination titers are usually attained between the first and second week. Group 0 erythrocytes are used in these tests because they lack A and B isoagglutinogens. Suspensions of washed erythrocytes in 2 per cent concentration are mixed in equal volumes with serial dilutions of serum, and agglutination is read after the mixtures have stood overnight in the refrigerator.

The frequency with which significant titers of cold hemagglutinins were found in patients with primary atypical pneumonia has varied considerably in different published studies and appears to be influenced by several factors, particularly the severity of illness, the manner in which the serum is separated, and the concentration of red blood cells used in the test. The incidence and

titer of cold hemagglutinins have generally been higher in the serum of more severely ill patients. Cold hemagglutinins may be completely removed from serum by absorption with human red blood cells in the cold. Therefore, unless the serum to be tested is separated from the clot prior to refrigeration, cold hemagglutinins present may be reduced in titer or removed entirely. In tests carried out with concentrations of red blood cells of less than 2 per cent higher titers are obtained, but reactions with normal serum or serum from patients with other illnesses occur more frequently.

From an analysis[15] of published investigations of cold hemagglutinins in cases of primary atypical pneumonia and regarding 1:40 as the minimal significant titer, it appears that approximately 50 per cent of patients develop this unusual and unexplained serologic property. Under similar conditions the occurrence of cold hemagglutinins in control sera is probably less than 5 per cent, and in serum from patients with other common illnesses a rise in titer is almost never seen.

In the course of studies at the Hospital of The Rockefeller Institute a nonhemolytic streptococcus, designated streptococcus MG, was first isolated from the lungs of a patient who died elsewhere of atypical pneumonia. Subsequently[16, 17] by means of specially devised selective media the same microorganism was recovered from the lungs in five other fatal cases and from sputa or nasopharyngeal washings of fifty-three patients. Although sometimes found in the respiratory passages of human beings who are healthy or ill with other forms of respiratory disease, streptococcus MG appears to occur most frequently in patients with primary atypical pneumonia.

All strains of streptococcus MG isolated to date belong to a single serologic type.[16, 17] Present evidence indicates that streptococcus MG represents a distinct and previously undifferentiated species of nonhemolytic streptococcus. Streptococcus MG is infectious in high dilution in chick embryos but not in any other species tested. This microorganism possesses a capsular polysaccharide which is responsible for the type specific serologic reactions obtained with it. Injection of streptococcus MG into animals results in the production of antibodies against both the specific capsular polysaccharide antigen and another somatic antigen present in the organism.

The capsular polysaccharide when injected into rabbits fails to stimulate antibodies, but in man results in the development of antibodies capable of agglutinating the streptococcus and precipitating the capsular polysaccharide. Individuals whose serum contains antibodies against streptococcus MG sometimes show dermal reactions to injections of capsular polysaccharide. It has been found and confirmed by other workers[5, 18, 19] that during the course of primary atypical pneumonia many patients develop antibodies against streptococcus MG. This can be demonstrated by agglutination tests with the organism or in certain instances by precipitation tests with the capsular polysaccharide. Moreover, it can be shown that these patients develop antibodies against both the specific capsular polysaccharide antigen and a somatic antigen of the microorganism.

In summarizing the published serologic data,[15] and regarding a titer of 1:20 or more as significant, approximately 50 per cent of patients with primary

atypical pneumonia develop agglutinins for streptococcus MG whereas in normal persons or patients with other disease such antibodies are found in 5 per cent or less. Appreciable increments in agglutination titer apparently are rare during illnesses other than primary atypical pneumonia. It will be recalled that the occurrence of cold hemagglutinins is similar. The highest incidence of agglutinins for streptococcus MG occurs between the fourth and sixth weeks of illness and in most instances agglutinins are first detected at the time of defervescence or later during convalescence. Using duration of fever and of pneumonia as criteria for severity of illness it has been noted that there is a positive correlation between the severity of illness and the incidence of streptococcal agglutinins as well as the agglutination titer.[4] In this respect there is also a similarity to the occurrence of cold hemagglutinins. Cold hemagglutinins occur predominantly, but not exclusively in sera of patients possessing agglutinins against streptococcus MG, although each may occur in the absence of the other. It can be shown, however, by cross absorption experiments that the two phenomena are independent of each other and can be clearly differentiated.

During the past several years numerous reports have been published by different groups of investigators indicating the recovery of various infectious agents from patients with primary atypical pneumonia. Most of these reports have been cited repeatedly by various authors in reviews.[3, 4, 7, 8-11] At present there is no published confirmation or additional evidence available to warrant the conclusion that any one of the agents described is etiologically responsible for the majority of cases of primary atypical pneumonia. Latent viruses harbored by apparently normal animals used in transmission experiments have been encountered frequently and have seriously complicated efforts to recover an infectious agent from human materials.

The assumption that primary atypical pneumonia may result from infection with a filtrable agent has been supported by evidence presented recently by two different groups of investigators. Eaton and his associates[20] have reported the recovery from several patients of a virus transmissible in chick embryos which they believe to be the causative agent of primary atypical pneumonia. They found that cotton rats and hamsters inoculated with infected chick embryo materials developed pulmonary lesions and presented evidence to show that patients with the disease develop neutralizing antibodies against this agent. The Commission on Acute Respiratory Diseases, Fort Bragg, N. C.,[3, 21] has reported the transmission of primary atypical pneumonia to human volunteers. Of particular interest is the observation by these workers that approximately 25 per cent of volunteers inoculated with filtrates of sputum and nasopharyngeal washings from patients with primary atypical pneumonia developed the disease. Confirmation of these experimental results which suggest a virus etiology for this form of pneumonia has not yet been reported by other workers.

The isolation from patients with primary atypical pneumonia of a nonhemolytic streptococcus of a single serologic type (streptococcus MG) and the development in such patients of antibodies against two distinct antigenic components of this microorganism have been mentioned. Both the presence of

this streptococcus and the development of antibodies against it in patients have been confirmed by other groups of workers.[5, 18, 19] This microorganism has not been tested for its capacity to produce disease in human beings. Normal persons inoculated intradermally with the capsular polysaccharide of this streptococcus develop in their serum specific antibodies against it, but whether the occurrence of such antibodies in man is accompanied by immunity to the disease is not known.

The present state of information regarding primary atypical pneumonia may be summarized as follows. A closely similar, if not identical, clinical picture may be produced by a variety of different infectious agents known to be pathogenic for man. A very large number of cases has been reported in which these agents of recognized pathogenicity were excluded as etiological factors and in which the causative agent or agents remain uncertain. Whether all of these cases represent infection by the same or different agents is not known. Approximately 50 per cent of patients with primary atypical pneumonia develop in their serum cold hemagglutinins and also agglutinins against streptococcus MG. Although either variety of agglutinin may occur alone, in the majority of instances, when one is demonstrable the other is also, and both are more likely to occur in patients who are more severely ill. These two unrelated reactions provide the best available laboratory procedures in support of clinical diagnosis. Conclusive evidence concerning the infectious agent or agents responsible for the majority of cases of primary atypical pneumonia is still lacking. Present evidence, however, suggests the possibility that both a virus and streptococcus MG may together be implicated in the pathogenesis of this puzzling disease.

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GROWTH OF CHILDREN WITH DIABETES MELLITUS IN RELATIONSHIP TO LEVEL OF CONTROL OF THE DISEASE

ROBERT L. JACKSON, M.D., AND HELEN G. KELLY, M.S.
IOWA CITY, IOWA

INTRODUCTION

ONE of the major questions regarding the treatment of young patients with diabetes mellitus is what constitutes an adequate level of control of the disease. To the present time we have found it practicable to aim to keep the diabetic child free from insulin reactions and from excreting sugar in the urine while receiving a normal diet.[1, 2] As our group has enlarged and the period of observation has lengthened we are endeavoring to evaluate our records to see whether or not anything has been gained by maintaining this high level of control.

The present study was undertaken to determine the relationship between the growth of children with diabetes mellitus and the level of control of their disease.

SUBJECTS

The records of 134 juvenile diabetic patients under treatment at the Children's Hospital were reviewed for this study. Of these patients 66 are boys, and 68 are girls. The onset of the disease had occurred, for 8 per cent, by the second year; for 52 per cent by the eighth year; and for 92 per cent by the thirteenth year. The median number of years of observation for the 120 children included in the longitudinal study is five years; 10 per cent were observed two years; and 13 per cent for ten or more years.

Most of the children are third generation American-born of northern European stock. About one-half of the children are from middle class families with incomes adequate to provide a decent standard of living in the rural communities of Iowa. The remaining one-half are from a low income group who have had assistance from their county, state, and social agencies in order to alleviate a great many social and economic difficulties.

OBSERVATIONS

At the time of examinations, which were at approximately six-month intervals, a record was made of the child's height and weight. These measurements were plotted on a growth chart and thus was obtained a picture of the child's growth over the years of diabetic care in our clinic. For each child in this study there was a growth chart. There was also available for each patient a summary card that shows, among other items, the level of diabetic control the patient had maintained during the interval between examinations. We have correlated the information available from the growth of the child, and from an over-all assessment of the level of control of the disease during the period of expected growth.

From the Department of Pediatrics, State University of Iowa.
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METHOD AND PROCEDURE

All of our diabetic outpatients were routinely asked to keep a daily record showing dosage and distribution of insulin; results of examination of three to four urine specimens for sugar; insulin shocks; emotional upsets; infections; and any variation in exercise or diet. The daily records are reviewed at the time of each examination and the level of diabetic control for the period determined and recorded.

The interpretation of the varying levels of diabetic control is given in this tabulation:

Very good-to-excellent: Urine specimens are free from sugar except for very occasional traces; very occasional mild insulin shocks

Good: Urine specimens free from sugar except for occasional traces; occasional mild insulin shocks

Fair-to-good: More than one-half of the urine specimens free from sugar but minimal glycosuria in remaining specimens; occasional insulin shocks of varying degree

Fair: Less than one-half of the urine specimens free from sugar and varying amounts of sugar in remaining specimens; occasional insulin shocks of varying degree

Poor: Urine specimens contain varying amounts of sugar continuously; occasional insulin shocks

For the majority of the children there were no wide fluctuations in the level of control over several years. Many fluctuated from one level to an adjoining one. For these we gave the classification of the level that prevailed for the most part. This scale graded the 120 children into groups ranging from poor to excellent diabetic control during the period of growth.

To evaluate the growth of the juvenile patients the height and the weight were observed at each examination. These values were plotted on a growth chart for the individual. Thus his progress was charted and a valuable pictorial record of his growth was obtained. (Figs. 1 and 2.)

Several authors studying the growth of diabetic children have questioned whether or not the available norms were suitable to evaluate the growth of their particular groups. We consider this an important issue. For this study the Iowa City Growth Charts were used.[3] These charts were devised using Iowa City data because it is believed they give a standard of growth that approaches the optimum for general pediatric practice. This high level accrues from the selection of subjects, most of whom were favored by environment.

The background of the children in the present study is similar to the children on whom the growth charts are based, geographically and as to the time the observations were made; and to a large extent both groups are American born of northern European origin. The socioeconomic level of the study group is lower than that of our norms. Provision for nutrition of many of the diabetic patients was substandard before admission to our clinic. The regimen of therapy for the diabetic child in our clinic provides for excellent nutrition and since the diabetics are supervised more closely than nondiabetics

it is likely that their regimen was superior to that followed in general by the children on whom the norms are based.

The growth curves of the patients used in this study extend over at least a two-year period and the average length of observation is five years. In order to have more nearly homogeneous groups we considered separately the growth before 10 years of age and the growth after 10 years. In the years before 10 there are fifty-four subjects and in the years after 10, ninety-three subjects.

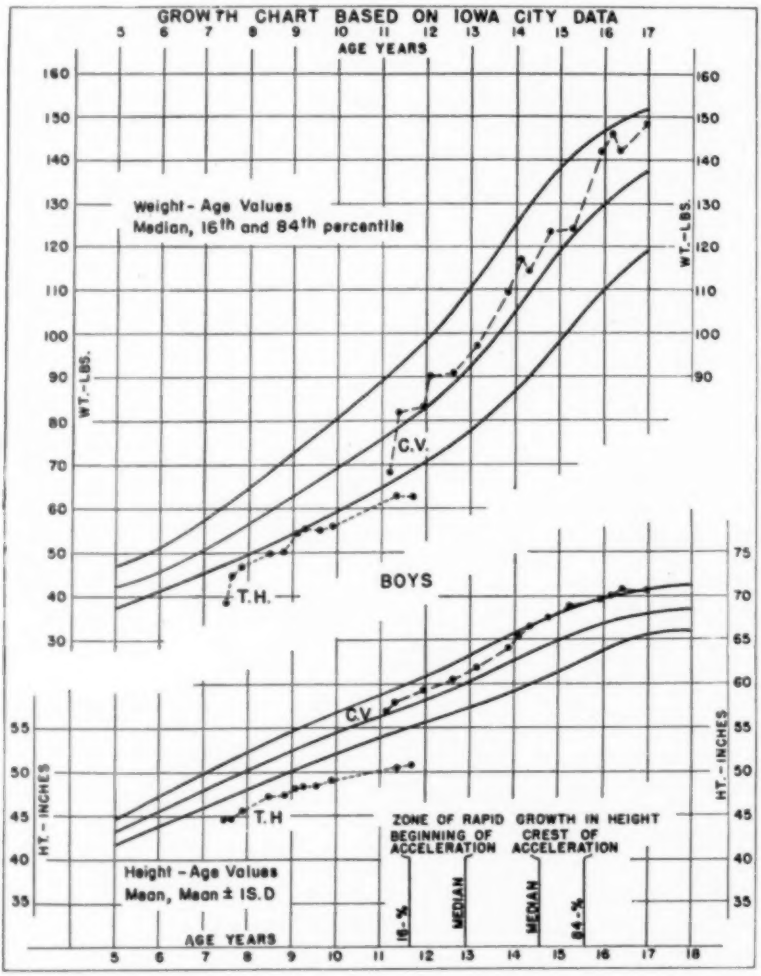

Fig. 1.—The growth curve of C. V. was selected to demonstrate the satisfactory growth in height and weight of a boy with moderately severe diabetes kept under excellent control. The growth chart of T. H. illustrates the unsatisfactory growth in height of a child with moderately severe disease kept under poor diabetic control.

In studying these growth charts with the view to correlating the growth evaluation with the level of diabetic control we have designated the rate of growth:

Accelerated: The curve of the individual's height follows a course that is more steeply inclined than the curve of the chart for the whole period of observation or for part with the remaining part normal growth

Normal: The curve of the individual's height parallels the curve of the chart

Less: The curve of the individual's height follows a course less steeply inclined than the curve of the chart for the whole period of observation or for part with the remaining part normal

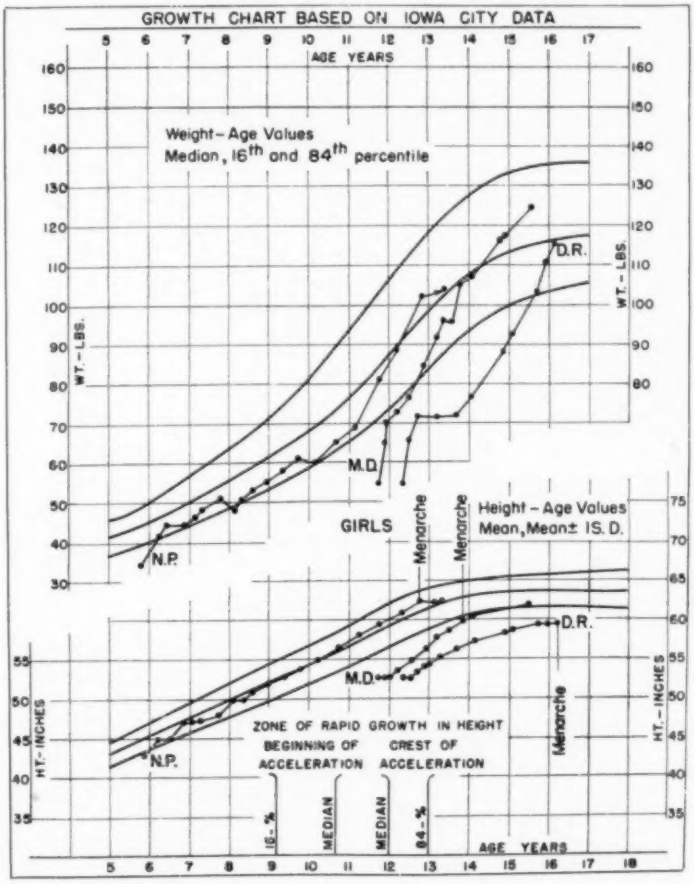

Fig. 2.—N. P.'s growth chart was selected to demonstrate the growth of a child with early onset of diabetes. Her disease was severe but kept under excellent control throughout childhood. She had accelerated height gains and maturated normally. M. D. and D. R. are two girls who had the onset of diabetes during the prepuberal period. Both came to our clinic about one year after onset. At the time of first examination both were more than 2 standard deviations below the average height for their age. M. D.'s disease was under good control and D. R.'s control was poor. M. D. made better height gains and maturated more normally than D. R.

Erratic: The curve of the individual's height changes its course from a period of accelerated to a period of less than normal growth or vice versa

FINDINGS

Height at Beginning of Treatment.—The children came to our clinic at varying lengths of time after the onset of the disease, and so we have height and weight observations on only a small proportion at onset. Eighty-six of the patients were admitted within six months of the onset of diabetes. It is conceded that within six months the disease could have had its effect on height. Nevertheless we are considering any height observation made within six months of onset as proportionate to his height at onset and comparing the heights of the group with the norms, to see if our group of diabetics at the onset of the disease deviated significantly in height from the Iowa City norms. The heights of 36 (42 per cent) children deviated less than ±1 standard deviation from the average height for age as given by the norms. Thirty-five (41 per cent) of the children were 1 standard deviation or more below the average. Fifteen (17 per cent) were 1 standard deviation or more above the average height for age. Judging the diabetic sample of height at onset by the sample of Iowa City children on which the Iowa City Growth Charts are based, there were fewer heights in the zone average ±1 standard deviation than expected, and more than the expected number were 1 standard deviation or more below the average. This might be interpreted as indicating the standards are high for the group of children on a socioeconomic basis. However, since many children showed accelerated growth after the diabetic regimen at our clinic was begun, we are inclined to interpret the greater number of shorter children as a failure to grow properly under their former regimen. The distributions of height deviation from the norm at onset and at last observation of 86 patients are:

HEIGHT DEVIATION (STANDARD DEVIATION UNITS)	OBSERVATION WITHIN SIX MONTHS OF ONSET	LAST OBSERVATION
−2 and under	6	7
−1 to −1.9	29	16
−.9 to +.9	36	47
+1 to 1.9	12	14
2 and over	3	2

At the beginning of treatment at our clinic 22 patients' heights deviated from the average a negative 2 standard deviations or more. Twelve of these patients were seen within two years of the onset of the disease. The five children with the most stunting (negative 3 standard deviations or more) were admitted to our clinic two to seven years after the onset of the disease.

Later, of these 22 patients,

13 had accelerated growth rates
5 had normal growth rates
2 had erratic growth rates
2 had less than normal growth rates

Growth in Height in Relation to Level of Control.—Fifty-four patients comprise the group with early onset of diabetes and with records for at least two years prior to 10 years of age. This group was observed during the part of the growing period which is characterized, in general, by relatively slow and regular linear growth. A second group of 93 children was observed after they had reached their tenth year and during the ages when children, in general, have a "spurt" of growth. On the whole, the rate of growth of these older children is difficult to evaluate since there are a number of factors that make growth at this age unpredictable for even the well child.

TABLE I

LEVEL OF CONTROL OF DIABETES MELLITUS	GROWTH IN HEIGHT BEFORE 10 YEARS OF AGE COMPARED WITH THAT OF AVERAGE IOWA CITY CHILDREN[3]								
	LESS		ERRATIC		NORMAL		ACCELERATED		TOTAL
	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER
Poor	3	38	1	12	3	38	1*	12	8
Fair	3	25	1	8	8	67			12
Fair-to-good			3	19	10	62	3	19	16
Good	1†	8	1†	8	3	25	7	58	12
Very good-to-excellent					2	33	4	67	6
Total	7	13	6	11	26	48	15	28	54

*This patient accelerated the first year of treatment when he was under fair-to-good diabetic control. He was emaciated at the time treatment was started and had been under poor diabetic control for more than one year.

†These patients failed to keep their appointments at the clinic, and their diets were not increased to satisfy their appetites.

Group Observed Before 10 Years of Age.—In the younger age group 20 of the 54 children were under poor or fair control (Table I). Of these 20 only one patient accelerated in growth and that was during his first year of treatment when he was kept under fair-to-good diabetic control. Of the seven children who grew less in height than expected, six were in poor or fair diabetic control, and one was in good diabetic control but his history reveals that he failed to keep his clinic appointments and his parents did not increase his diet properly from age 5 to 8 years. Fifteen of the 54 children (28 per cent) made accelerated growth and all of these patients were under fair-to-good, good, or very good-to-excellent diabetic control, except the one child in poor diabetic control who has been discussed. From these findings it is apparent that children under poor diabetic control have a great likelihood of growing less in height than expected, that children under fair or fair-to-good diabetic control have a good chance of growing at an average rate, and that children under good or very good-to-excellent diabetic control have the opportunity of making compensatory or accelerated growth. The data of Table I, analyzed statistically, give chi-square equals 27.69 which is significant beyond the 1 per cent level of confidence.

Group Observed After Ten Years of Age.—Of the 93 diabetic children for whom we have growth charts and observations after 10 years of age a group of

34 had the onset of the disease before 9 years of age and received treatment in our clinic before 9 years; a second group of 11 patients had the onset before 9 years of age and received treatment at our clinic after 9 years of age; and a third group of 38 had the onset of the disease after nine years of age and received treatment in our clinic while they were still in the growing period (Table II).

TABLE II. GROWTH IN HEIGHT OF DIABETIC CHILDREN AFTER 10 YEARS OF AGE COMPARED WITH THAT OF AVERAGE IOWA CITY CHILDREN

LEVEL OF CONTROL OF DIABETES MELLITUS	LESS	ERRATIC	NORMAL	ACCELERATED	EXTENDED GROWING PERIOD (GIRLS)	TOTAL
Group I	*Onset before 9 years and hospital treatment before 9 years*					
Poor	2		2			4
Fair	2		7	1*		10
Fair-to-good	1		6	6		13
Good			2	3		5
Very good-to-excellent			1	1		2
Group II	*Onset before 9 years and hospital treatment begun after 9 years*					
Poor						
Fair	1			4	1 of 6	6
Fair-to-good			3	2	0 of 4	5
Good						
Very good-to-excellent						
Group III	*Onset after 9 years and hospital treatment after 9 years*					
Poor					1 of 1	1
Fair			6		1 of 3	7
Fair-to-good		1	4	12	1 of 5	18
Good	1†		7	4	3 of 9	15
Very good-to-excellent			4	2	1 of 4	7
Total	7	1	42	35	8	93

*Although this overprotected boy had rather frequent and marked glycosuria it was primarily caused by diet indiscretions. The glycosuria was always of short duration as larger doses of insulin were given by the mother.

†This patient, a boy, was admitted for treatment at our clinic when 14 years, 5 months old. This was ten months after the onset of the disease. His height previous to admission is not known. He made normal gains up to 16 years, after which he grew less than expected. It is difficult to say whether or not his growth was arrested too early, but from 16 to 20 years he grew only one-half inch. His height at last observation was 67.1 inches.

Group I represents a wider range of diabetic control than the other two groups observed after 10 years of age. Unfortunately, from the point of view of our study, there is no patient with poor control in Group II and only one in Group III. There are also several cases in which the children seem to be having prepuberal growth disturbances in height but these cannot be properly evaluated until they have been observed a few more years.

The distribution of cases of Group I according to level of diabetic control and growth in height shows that there is a likelihood for children under poor control to grow less than expected. With fair control children have a good chance to make average height gains and with a fair-to-good or better level of control many may show accelerated growth. D. B., a girl in Group I, exemplifies one of the difficulties encountered in evaluating the growth of children in this age period. She was under fair-to-good control and grew less than expected from 10 to 13½ years. She is being observed currently. Menarche has not occurred and there is the possibility that she may have late menarche

and an extended growing period. At 13½ years her height is 53.6 inches which is about 4 standard deviations below the mean for her age.

The distribution of cases of Group II according to level of diabetic control and growth in height shows that children who have had the disease poorly controlled for two or more years and then are placed under our regimen of therapy frequently show accelerated growth rates with only fair control. That all the children in this group were maintained on fair or fair-to-good diabetic control also confirms our clinical experience that it is difficult to maintain children on good or excellent control after years of poor diabetic management. B. S., a girl, is the only patient in Group II who grew less than expected during observation. The onset of her disease was at 8 years and she was admitted to the hospital clinic two years later. Under a fair level of control she grew less than expected from 10 to 16 years. Menarche had not occurred at 16 years. At 10 years her height was a negative 1½ standard deviations and at 16 years a negative 2¼ standard deviations from the mean for her age.

We have noted for a number of girls that the growing period has been extended a few years beyond that which is usual for girls in general. (Table II.) The data are not sufficient to permit any conclusions as to the relation of this type of growth to level of control. The factor of sex assumes more importance in evaluating the growth disturbances in this older group of children than it does in the group observed before ten years of age.

In Group III only one child is rated as under poor control. The growth of this girl, D. R., is shown in Fig. 2. Her menarche occurred at 16 years, 2 months, and her growing period was longer than usual. There apparently was a growth disturbance. On the chart her growth is contrasted with that of M. D., a girl, who was under good control. M. D. had her acceleration in growth between 12 and 14 years and menarche occurred at 13 years, 9 months. There were no obvious failures to grow in this group.

For this group of children (not including the seven girls with extended growing period) who had the onset and hospital treatment after 9 years of age, those under fair control made average gains and those under fair-to-good, good, or very good-to-excellent diabetic control made average or accelerated gains.

Erratic Height Gains and Level of Control.—On evaluating the growth of the children for the whole period of observation we found six children with erratic growth. Three of the children who had definite and prolonged periods in various levels of control showed a positive correlation between level of diabetic control and growth in height. During periods of lower levels of control the growth in height was less than expected and during the periods of higher levels of control the growth in height was normal or accelerated. For the other three children who had changes in level of control not so pronounced or prolonged the correlation with growth, if any, was indeterminate from our observations. However, these three children did have erratic levels of diabetic control as well as erratic height gains.

Menarche of Diabetic Girls in Relation to Level of Control.—Menarcheal histories are available for 35 of 46 diabetic girls observed during the years of expected menarche. Seven girls had their first menstrual period before the onset of diabetes—two at as early as 11 years. Twelve of the 28 girls remaining had the onset of the disease before 9 years. The three girls who were under very good-to-excellent diabetic control matured normally. Of the five girls who were under fair-to-good diabetic control, three matured normally and two were delayed. All of the four girls who were under fair diabetic control were delayed in maturing.

Sixteen of the 28 girls had the onset of diabetes between the years 10 and 14. Nine of these were under good-to-excellent diabetic control. Six of these matured normally and three were delayed. J. E., of this group, was 14 years and 10 months old on admission to this clinic, which was three years after the onset of the disease. Menarche occurred at 17 years. R. N., another of this group, had her disease one year before admission to our clinic at the age of 12 years, 10 months. Menarche was at 15 years, 10 months. M. L. A., also of this group, was 13 years and 8 months old at the time of the onset of her disease. She was admitted to the hospital three months after onset and her menarche occurred at 16 years, 8 months. Of the three who were in fair-to-good diabetic control two matured normally and one was delayed. Of the four who were in fair or poor diabetic control, one matured normally and three were late. A longer than average growing peroid was generally coexistent with delayed menarche. This relationship was present for 11 of 13 patients.

Growth in Weight Observed for the Total Group.—With adequate management the diabetic children, on the whole, have maintained normal weight for their age and height, and have gained normally during the years of observation included in this study. Twenty-six children were observed to have a tendency to become obese. Some of our well-regulated diabetics made no gains or had losses in the summertime when exercising more than usual.

The trend toward obesity was observed in 21 of the 26 children during the ages 14 to 18 years. For the remaining five children the tendency to obesity occurred during the earlier years of childhood. The overweight for height and age was corrected for three of the children by improving their regimen. The two other children were observed seven and nine years; one was under fair-to-good diabetic control, the other under poor diabetic control; both grew less in height than expected and remained overweight for their age and height.

The children who were underweight at the time of admission to our clinic responded readily to treatment and were back to normal weight for age and height in about six weeks.

A larger proportion of the girls (approximately 34 per cent) than boys (approximately 17 per cent) of those observed at the ages from 14 to 18 years showed accelerated weight gains and drifted toward obesity. Following is a tabulation of the children who showed a drift toward obesity in relation to the level of control of their diabetes.

LEVEL OF CONTROL OF DIABETES	NUMBER OF BOYS	NUMBER OF GIRLS
Poor	1	3
Fair	2	8
Fair-to-good	2	4
Good	0	1
Very good-to-excellent	0	0
Total	5	16

Sixty-seven per cent of those who had accelerated weight gains with a tendency to become obese were in poor or fair diabetic control. Girls often manifested this tendency to become obese after menarche had been established.

Severity of Disease.—Using the common index of the severity of the disease, the amount of insulin required per kilogram of body weight, we found there was a tendency for those with less severe disease to be under the best control. However, there is a representative number of patients with moderately severe and very severe diabetes under each of the designated levels of control. Of 95 patients with moderately severe or very severe diabetes:

8 are under very good-to-excellent diabetic control
15 are under good diabetic control
37 are under fair-to-good diabetic control
26 are under fair diabetic control
8 are under poor diabetic control

Growth of Children With Severe Diabetes and Level of Diabetic Control.—Of the eight patients with moderately severe or very severe diabetes under very good-to-excellent diabetic control, four accelerated and four grew normally. All of these children were adequately treated shortly after the onset of their disease. None of these children were below expected height for their age at the time of their initial examination.

A group of ten children, who had moderately severe or very severe diabetes and an early onset of the disease so that they were observed at least two years before the age of 10 years, were under good, very good, or excellent diabetic control. Seven of these children had accelerated growth in height, two made average gains, and one grew less than expected. It is known definitely that the last child, during a lapse of three years from the clinic, did not increase his diet to satisfy his appetite. This small but homogeneous group supplies evidence that children with severe disease grow well if adequately managed.

A similar group of seven children with moderately severe or very severe diabetes with early onset and under prolonged poor control included three who made average gains, one who was erratic, and three who grew less than expected.

DISCUSSION

Numerous growth studies of children with diabetes mellitus have been reported.[4-11] These studies reveal that compensated diabetes is compatible with

normal growth but that many children with the disease do not grow normally. The importance of an adequate diet has been established for the diabetic as well as the nondiabetic child.[12, 13] The hereditary, geographic, and socioeconomic factors can be minimized in evaluating the growth of a child by using a method which studies the child not only as he grows in relationship to others, but as he establishes and maintains his own pattern of growth. A factor which has not been given sufficient emphasis in most of the studies is the importance of the level of control of the disease.

Ladd[5] observed that a diabetic child will grow well when he is kept sugar-free and receiving an adequate diet. Boyd and Nelson[6] state that "the child will grow normally providing the control is such that prolonged or repeated hyperglycemia is avoided and the child's nutritional requirements met by an adequate diet." Boyd and Kantrow,[7] studying the retarded group of children in this clinic prior to 1935, demonstrated that many of the children receiving an adequate diet and on a high level of diabetic control showed acceleration of growth. Wagner, White, and Bogan[9] found no relationship between retardation of growth and level of control of the disease. These authors consider a child in very good diabetic control if he is excreting no more than 10 per cent of the ingested carbohydrate, in good diabetic control if he is excreting no more than 20 per cent of the ingested carbohydrate, and in poor diabetic control if he is excreting more than 20 per cent of the ingested carbohydrate. We are of the opinion that any child excreting as much as 10 per cent of his ingested carbohydrate is approximating poor diabetic control. The very good control group, as defined by these authors, would include the first four groups by our standards of control (very good-to-excellent, good, fair-to-good, and fair). The good control group by their standards would comprise, for the most part, our poor control group.

The differences in the findings on the status of the height of the child at onset of diabetes by several authors may, in a large measure, be accounted for by the differences in the appropriateness of the standards used in evaluating the groups and by a difference in the opinion of the several authors as to what constitutes a tall or short child. Fischer and associates[10] found a tendency to be tall for the children whom they studied. We have found more than the expected number of children to be short. Whereas they considered a child tall if he were one inch or more above the mean of the Burgess standard of height for his age, using the Iowa City Growth Charts we considered any child tall who was 1 standard deviation or more above the mean height for that age. The standard deviation increases with age from approximately one and one-half inches at 5 years to three inches at 12 years.

Recognizing that the nutritional advice was followed more carefully by some patients than by others and that errors in diet were a major factor many times in causing glycosuria, it is our belief that the children generally were offered an excellent diet. Some of the children in poor diabetic control neglected to carry out instructions including dietary advice, and therefore some of their retardation of growth may have been on a dietary basis. Some of the children who grew less than expected and were under poor diabetic

control were known to be receiving an adequate diet. The younger group of children under fair diabetic control and known to be receiving an adequate diet occasionally grew somewhat less than expected and at best made normal increments of growth. Acceleration occurred in the younger group of children only when they were receiving an adequate diet and maintained a good level of diabetic control. In the older group of children four patients under only fair diabetic control had accelerated growth. All of these children had been treated elsewhere for at least two years under poor diabetic control and with a questionably adequate diet. The majority of recent studies reported in the literature consisted of children receiving adequate diets but under less rigid levels of control. These children have not grown as well as those observed by us receiving comparable diets but who maintained a higher level of diabetic control.

Avoidance of retardation both of growth and of maturation is important from the psychological as well as the physical basis. McGavin and associates[8] found that many children were more disturbed emotionally over their short stature than by the fact that they had diabetes. The children had a tendency to become seclusive or compensated by a show-off behavior and boastfulness, exaggerating everything they said or did.

No child observed in this group had clinical evidences of endocrine disturbances other than hypoinsulinism.

SUMMARY AND CONCLUSIONS

The growth of the 120 diabetic children in this study group showed a much stronger tendency to be normal or to be accelerated than to be retarded.

In evaluating the growth of the diabetic children the Iowa City Growth Charts were used. These standards are comparatively high, but the background of the children in the study group is similar in many ways to that of the children on whom the standards are based.

For the study of the relation of growth in height to level of diabetic control the data have been broken down into groups, one of which consists of observations before 10 years of age and the others of observations after 10 years of age. This was done to segregate the characteristics of growth associated with prepuberty.

The differences in growth of children grouped according to the level of control of diabetes are significant for those observed before 10 years. Table I shows that children under good-to-excellent diabetic control have a better chance to accelerate than those under lower levels of diabetic control. Those under poor diabetic control or fair diabetic control did not accelerate. Six of the seven children who grew less than expected were classified as being under either poor diabetic control or fair diabetic control. Normal growth was found for approximately two-thirds of those under fair or fair-to-good diabetic control, but since many of these children have some retardation we feel that compensatory growth might have been effected by a better level of control of the disease. Erratic growth is more frequent for children in fluctuating levels of control.

The growth of children after 10 years is more unpredictable and difficult to evaluate than the growth before 10 years. The differences in growth of the children observed after 10 years of age grouped according to level of diabetic control show a consistent tendency to be normal or accelerated for the better levels of control and to be normal or less than expected for fair or poor diabetic control. In this group are eleven children who were admitted to our clinic two to nine years after onset of the disease and during the intervening time they had been in poor diabetic control. Four of these patients accelerated after coming under our regimen of therapy even under fair diabetic control.

There is a tendency for the girls in the higher levels of diabetic control to maturate normally and for those in the lower levels of diabetic control to be delayed in maturating. A longer than average growing period is generally coexistent with delayed menarche. When the onset of diabetes occurs during the years 10 to 14, it is likely to interfere with the maturation processes. Three of nine girls who were under good-to-excellent diabetic control had delayed menarche; three of four girls under fair or poor diabetic control had delayed menarche. There is confirming evidence in this study that girls with the onset of the disease before 9 years maturate normally when kept under good or excellent diabetic control.

Severity of the disease is related to the level of control in that the children with the less severe disease tended to maintain the higher levels of control and all in the poor control group had moderately severe or very severe disease. Growth was evaluated in a group of ten children with early onset of diabetes in whom the disease was moderately severe or very severe and kept under good or excellent control. This group of children showed above average propensities to grow during the period of observation. Severity undoubtedly adds to the problems of control but does not appear to be the determining factor in regard to growth when the disease is well controlled.

This study demonstrates the importance of early and complete management in order to prevent retardation of growth and development. For the children already stunted from improper care the importance of complete management is also demonstrated as a means of ameliorating retardation of growth and development.

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THE HYPOXIA TOLERANCE TEST OF THE HEART IN CHILDREN*

EDGAR MANNHEIMER, M.D.
STOCKHOLM, SWEDEN

MODERN cardiological examination methods have gradually improved the possibilities of definite diagnosis, thereby adding to the prerequisites of appropriate treatment. In this way, more reliable information regarding the function of the heart during normal as well as pathologic conditions has been obtained. When, as is often the case, special heart function tests are described, it is easy to forget that all the common symptoms of a cardiac disease frequently form simultaneous indications of an unstable cardiac function. Dyspnea, nycturia, albuminuria, prolonged P-Q time in the electrocardiogram, and gallop rhythm in the phonocardiogram, to take a few examples, may all be signs of deteriorated cardiac function. This notwithstanding, it has long been realized that our knowledge of the relative heart insufficiency is inadequate. Much would be gained, could the heart be subjected to a tolerance test through an extra amount of exertion so as to produce, in a subject with latent decompensation, a reaction which would not occur in the case of a healthy person. Modern tolerance tests in adults have been worked out on the basis of this reasoning. The patients have been given various drugs, such as digitalis, and the cardiac effect has then been observed by means of electrocardiographic registration. Individuals with healthy hearts and those with diseased hearts have been made to do exercise of various kinds, as for instance, measurable work on a bicycle, or walking up and down a specially constructed flight of stairs at a known pace. Afterward the heart's response to the tolerance test has been registered in different ways (Nylin, Klemola). The drawback of such a procedure is that the effect is recorded *after* the termination of the exertion, in which case it should be noted that the heart undergoes an exceedingly rapid change after the completed tolerance test (Liljestrand and associates). Furthermore, these tests are unsuitable in the examination of children, however instructive they may be when adapted to adult patients.

In 1933 Dietrich and Schweigk for the first time made use of exhaled air with a reduced oxygen content for the purpose of studying the effect on the heart. This method has later been adopted by several investigators, of which Larsen (1938), Levy and associates (1940), Åkesson and Malmström (1945), Björck (1945), and Pruitt and associates (1945), may be mentioned here. All of them dealt with adult patients. The principal aim of their investigations has been to analyse the conditions of coronary insufficiency. Larsen had, in addition, observed the effect of hypoxia on patients suffering from diabetes, myxedema, as well as in a few cases of valvular diseases and myocarditis. Furthermore, tests of this kind have been employed in aviation-medicine investigations. I have not been able to find any data regarding such tolerance tests on children.

From the Pediatric Clinic of the Crown Princess Lovisa's Children's Hospital in Stockholm. Head: Professor A. Lichtenstein.

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Since 1937, when I had the opportunity of studying this method with Larsen at the Warburg Clinic in Copenhagen, I have had the idea of applying this method to a representative group of children. The greatest obstacle which had to be overcome was of a purely technical nature. It concerned the apparatus. Without access to an under-pressure chamber, and also considering the fact that children cannot without difficulty be made to breathe through a mouthpiece or into a "rebreathing apparatus," my first task was, of course, to construct a new apparatus which would be suitable for children of all ages. Quite a number of models have since appeared, each showing further simplification.

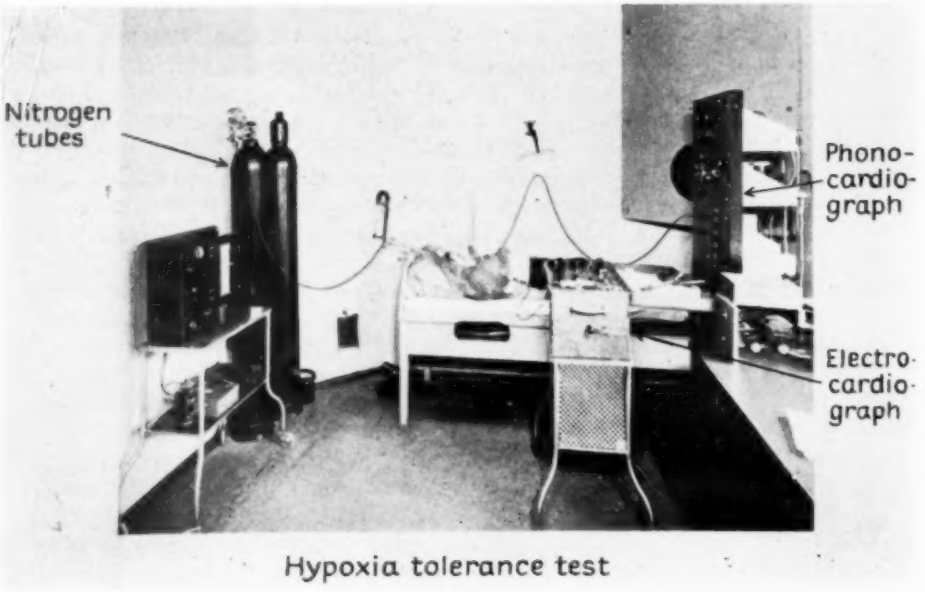

Fig. 1.

The apparatus now in use seems to function quite satisfactorily and has been constructed in collaboration with Mr. Emil Andersson, civil engineer at The Swedish Gasaccumulator Company in Stockholm. In principle, it represents a further development of the oxygen-carbon-dioxide mixer employed for oxygen therapy, which was described in 1939, by Lichtenstein and Mannheimer.

The apparatus functions thus: The nitrogen contained in a cylinder is conducted to an injector recording a certain volume per time unit. In our investigation, we chose the quantity of 7.8 liters of nitrogen per minute. The injector is constructed to suck in a certain amount of air simultaneously with the nitrogen. The air is made to pass through a rotameter with a float, which can be maneuvered into any desired position, denoting the quantity of air per minute. The respiration chamber is delimited by an adjustable metal ring with

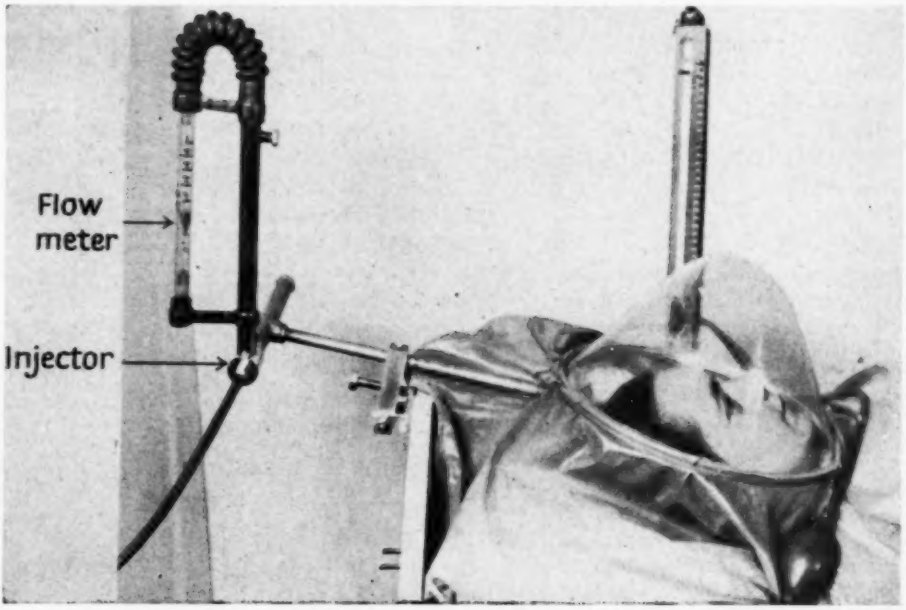
Flow meter
Injector

Fig. 2.

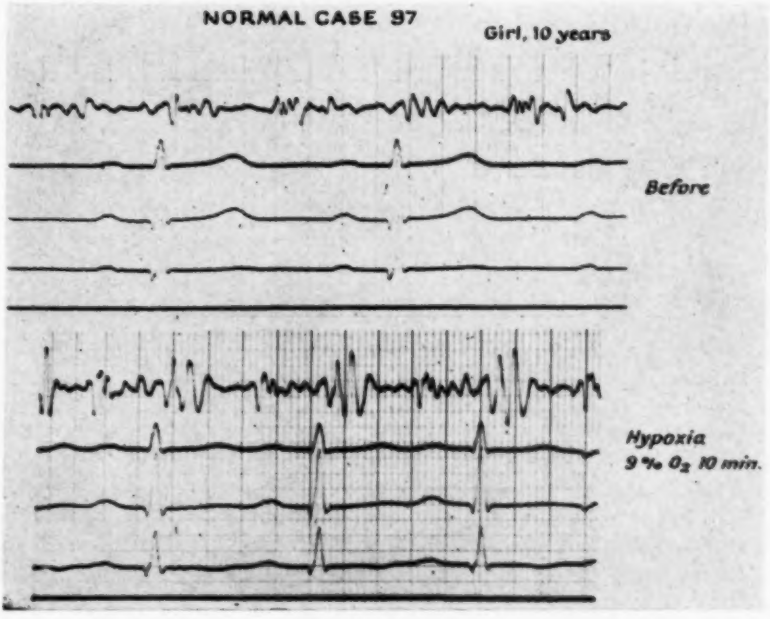
NORMAL CASE 97
Girl, 10 years
Before
Hypoxia
9 % O_2 10 min.

Fig. 3.

an attached oiled silk covering, onto which a hood of Plexiglas is placed. The increased ventilation (approximately 15 liters of gas per minute) causes such strong over-pressure as to render unnecessary special precautions to keep the oiled silk perfectly close to the back, shoulders, and chest of the subject. The hood of Plexiglas may be lifted off the metal ring at any time, if the patient should become restless or feel ill. A pipe from a cylinder of carbogen should be introduced into the respiration chamber to be at hand in case of danger. By varying the amount of inhaled air, a suitable oxygen content is obtained in the respiration air, from 6.8 to 11.7 per cent (Figs. 1 and 2). Table I gives one of the numerous attempts to determine the oxygen content in the respiration air. It will be seen that constant conditions prevail after four and one-half minutes. The uniform results obtained from recent control tests have afforded complete confidence in the contention that the oxygen content in the respiration air is in accordance with the value disclosed by the position of the rotameter (Table I).

TABLE I. OXYGEN DETERMINATION IN RESPIRATION AIR

Nitrogen 7.8 liters per minute
Oxygen 6.4 liters per minute

Theoretical result $\frac{x}{100}(7.8 + 6.4) = \frac{20}{100}\,6.4$

$x = 9\%\ O_2$

MINUTES	OXYGEN %
3	10
3½	9.6
4	9.5
4½	9.1
11	8.7
16	8.8

As a rule, the test has been carried out with 9 per cent oxygen for ten minutes. After this time, the patient remained lying down for five minutes. The electrocardiogram and the phonocardiogram registered before the test, and five, ten, and fifteen minutes after. The pulse was counted every other minute.

The results presented are of a preliminary nature. The normal data as well as the data from different cardiac diseases are not as yet comprehensive enough to warrant a statistical analysis, nor to make possible an exhaustive answer to the question of the value of this test. When, nevertheless, I have ventured to submit the results hitherto achieved, the reason is simply that the outcome thus far has been so encouraging as to justify a reference even at this moment to a tolerance test which should serve its purpose well in routine clinical work. The test takes only fifteen minutes and is easy to perform and, according to present experience, free from risks. In addition, the fact that all of the electrocardiographic changes and the rate of the pulse, five minutes after the termination of the treatment have resumed their original state before the test shows that the test can be adopted without risks (Figs. 5 and 7).

Several different criteria have been suggested with regard to positive hypoxia tests (Levy, Larsen, and Åkesson and Malmström). In the estimation of the values obtained I have not followed in detail any of the procedures

hitherto proposed. Instead, I have regarded the normal cases as a physiologic unit, considering definite deviations from it as pathologic. This has been feasible since the normal cases showed, without exception, insignificant changes during the tolerance test. Without doubt, the pediatrician is, in this respect, in a far more favorable position than specialists in internal medicine. It is no easy matter to procure normal data from, shall we say, patients from 40 to 50 years old with intact myocardium. Circumstances are quite different in regard to children's hearts which are normally healthy and strong (Fig. 3). This has formed the basis of the following criteria of positive hypoxia.

1. Electrocardiogram: A depression of the S-T intervals in Leads I or II of at least 1 mm.
2. Electrocardiogram: Negative or diphasic T_1 or T_2.
3. Electrocardiogram: Marked changes in the P-Q time.
4. Phonocardiogram: Appearance of gallop rhythm.

The age distribution of the cases is illustrated in Table II. Table III shows the pathologic cases hitherto examined, as well as the results obtained, in hypoxia tolerance tests.

TABLE II. CASES DISTRIBUTED TO AGE AND SEX

AGE (YR.)	NORMAL CASES		PATHOLOGIC CASES	
	BOYS	GIRLS	BOYS	GIRLS
1 to 5	1	1	3	4
6 to 8	3	5	8	6
9 to 11	4	8	4	7
12 to 14	2	1	4	11
15 to 17	4	1	3	4
	14	16	22	32
Totals	30		54	

TABLE III

	NUMBER OF CASES	HYPOXIA 9% O_2 10 MIN. RESULT	
		POSITIVE	NEGATIVE
Normal cases	30	0	30
Rheumatic carditis { active	7	7	0
Rheumatic carditis { healed	1	0	1
Patent ductus Botalli	6	5	1
Congenital defect without cyanosis	5	1	4
Congenital defect with cyanosis (morbus ceruleus)	1	1	0
Chronic polyarthritis	1	1	0
Myocardial failure	4	3	1
Gallop rhythms	29	9	20

All the normal cases have disclosed negative results in the tolerance test.

Seven cases of active rheumatic carditis have all been positive (Figs. 6, 7, and 8). Not less than three of these cases lacked definite electrocardiographic indications of the rheumatic infection. One case of a healed rheumatic carditis, without the slightest sign of a decompensated heart, had negative results.

Six cases of patent ductus Botalli have been examined. Not less than five of them were positive. However, this does not offer a true picture of the nature

of the Botalli cases in general, since patients with unusually severe cases have recently been admitted to the clinic (Fig. 9). Nevertheless, the result is noteworthy and contributes further toward strengthening the contention favoring the surgical treatment of such cases. It will be a matter of the greatest interest to follow patients with patent ductus arteriosus by means of hypoxia tolerance tests, both those already operated upon (Crafoord has sixty such cases), and above all, the cases where a comparison has been made between the conditions

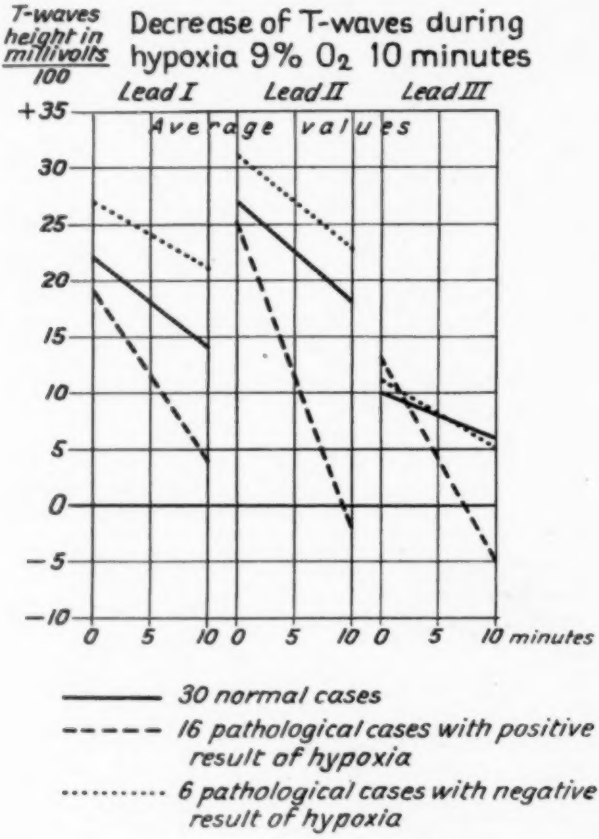

Fig. 4.

prevailing before and after the operation. At present, there are three such cases, two of which have become normal after the operation, while the third case (Fig. 9) revealed the same positive result before as after the surgical intervention. However, in the latter case only a fortnight had elapsed between the operation and examination.

Among five cases of congenital heart disease without cyanosis, only one had a positive result during the hypoxia tolerance test. One of the four negative

cases (Fig. 10) must, without doubt, be regarded as a severe congenital heart disease. The negative result indicates, in my opinion, the necessity of judging the outcome of the tolerance test otherwise than by electrocardiography or phonocardiography. It appears that several cases of cardiac diseases with dyspnea and cyanosis have reacted in a much more violent manner than the normal cases, even when electrocardiographic and phonocardiographic changes have failed to occur. For this reason, I plan to measure the oxygen content in the blood before and after the test. In this way, a better numerical manifestation of the effect of hypoxia on the body will be obtained.

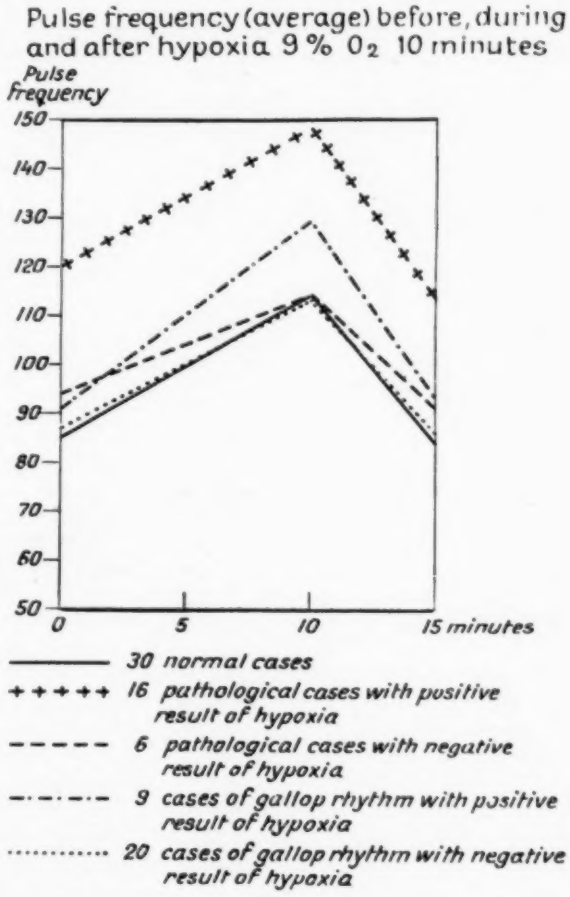

Fig. 5.

There are two positive cases in the group of postmyocarditis which have reacted during the hypoxia tolerance test by changes in the P-Q time, one with a prolongation and the other with an abbreviation of P-Q. Similar observations have been made by Larsen, but their significance is uncertain.

Finally, a few words shall be said of the gallop rhythms. This group comprises twenty-nine cases of third sound gallop which have been examined by Carlgren and will be presented in his work concerning the gallop rhythms. Only "pure" cases of gallop rhythm have been included, the cases of rheumatic carditis with simultaneous gallop rhythm having been transferred to the group of active rheumatic carditis. The "pure" gallop rhythms are, according to Carlgren, a manifestation of myocardial damage in quite a large number of cases. The result of the hypoxia tolerance test, nine positive cases (31 per cent), undoubtedly favors this assumption. Thus, it has been possible merely by means of electrocardiography to discover either a large or a small degree of latent cardiac insufficiency in almost one-third of the cases of gallop rhythm in children subjected to hypoxia tolerance tests (Fig. 11).

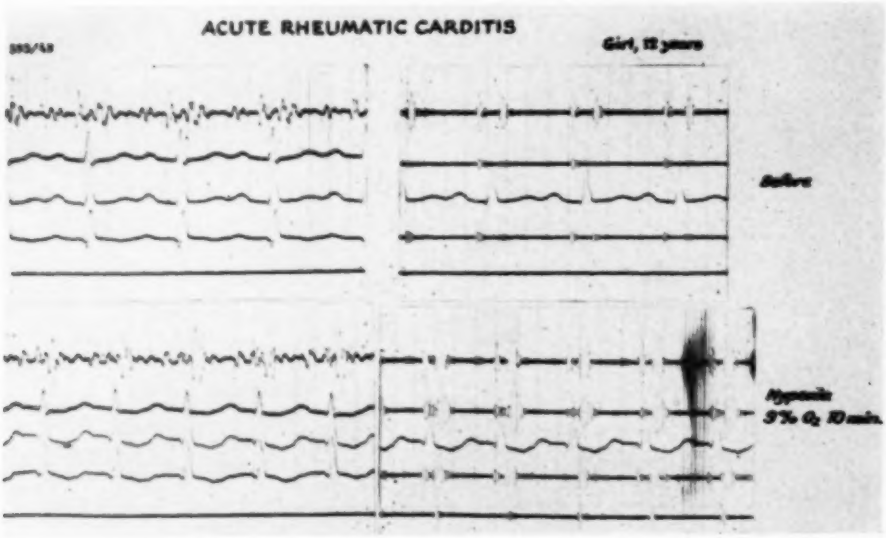

Fig. 6.

A graphic illustration of the effect of hypoxia on the T-waves is presented in Fig. 4. All the curves show a decrease during the tolerance test. In all three leads the tendency is extremely strong toward a much more pronounced decrease in cases with cardiac affections than in normal cases. In spite of the paucity of the data, it seems hardly conceivable that this difference should be due to chance.

The result of the pulse measurements is shown in Fig. 5. The original position of the pulse in the diagram will be seen to be higher in the pathologic groups than in the normal cases. The pulse increase is, remarkably enough, approximately equal in all the cases, with perhaps the exception of those with gallop rhythms which have reacted positively to the hypoxia tolerance test. In

these latter cases, a tendency toward a more pronounced increase in the pulse frequency during hypoxia may be discerned. It is possible that more comprehensive data may offer valuable information on this point. The old conception that a pulse increase after exertion would remain for a longer time in a child suffering from heart disease than in a healthy child cannot be verified by this investigation. The final value of the pulse, five minutes after the termination of the tolerance test, in all cases coincided with that originally recorded.

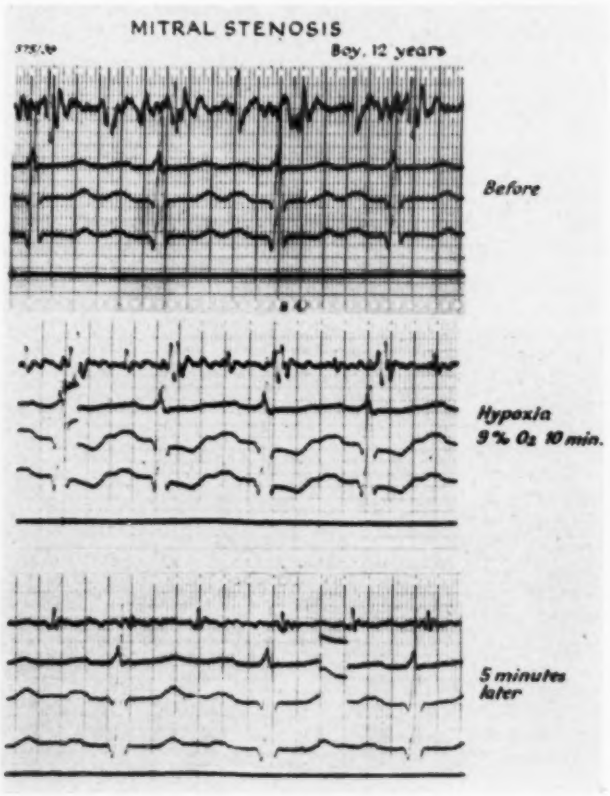

Fig. 7.

Naturally, limited data of this type must, particularly in regard to the pulse, disclose large variations within the respective age groups. It is, therefore, necessary to wait for the result from a larger test series before a more comprehensive analysis can be made of the correlation between the pulse and the hypoxia tolerance test.

A few examples of cases of various heart diseases subjected to hypoxia tolerance tests are given in order to illustrate this discussion.

CASE 1.—(Fig. 6. Electrocardiogram 593/45.) The patient was a girl, 12 years old, with a diagnosis of polyarthritis and recidivistic endocarditis. In 1944, she had had chorea minor, endocarditis, and anemia. In January, 1945, scarlatina, and later, pains in the left knee. Sedimentation rate, 39 mm., which at the time of writing had fallen to 10 mm. Cardiac examination: moderate enlargement, pronounced tachycardia, gallop rhythm, and a fairly short systolic murmur of high frequency over the apex. Blood pressure: 135/80.

Electrocardiogram showed a sinus tachycardia of approximately 150 beats per minute. QRS complexes disclosed notch formations, and no relative axis deviation. Pronounced Q_3. P-Q time of 0.15 second. T_1 and T_2 positive; T_3 negative with sloping S-T segments.

Phonocardiogram revealed a systolic murmur of 50 to 500 cycles per second. Pronounced summation sound gallop registered at 500 cycles per second disappearing when the patient was in an erect position.

Hypoxia test (9 per cent HO_2 for 10 minutes): Strongly depressed S-T intervals in all three leads. T negative in all leads.

Comparative electrocardiographic and phonocardiographic investigations, between June 26, and Sept. 25, 1945, have, on the whole, given similar results.

Heart x-ray (April 4, 1945): The size of the heart was 12.3 cm. in length, 9.6 cm. in breadth, and 9.5 cm. in sagittal measure. The volume equaled 510 c.c., which corresponds to 290 c.c. per square meter of body surface. There was no pathologic bulge in its contours; no changes in the aortic arch; no stasis of the lungs. The x-ray examination showed a fairly large heart without pathologic configuration.

CASE 2.—(Fig. 7. Electrocardiogram 575/39.) The patient was a boy, 12 years old, with the following diagnosis: rheumatic mitral valve disease; endocarditis recidivans (?). In July, 1939, he had angina and rheumatic endocarditis. During the next four months, a typical mitral stenosis developed. He was discharged Nov. 28, 1939, with a normal sedimentation rate. After this, he was in fairly good health until July, 1945, when conspicuous cardiac insufficiency was evident. He was readmitted with a sedimentation rate of 70 mm. Examination revealed a positive tuberculin test, but no definite signs of active tuberculosis. Heart examination showed distinct voussure, systolic and presystolic thrill over the apex, marked ictus, distinct enlargement of the heart, and prolonged systolic murmur with a short presystolic murmur over the apex. Blood pressure 130/60.

Electrocardiogram (Nov. 9, 1945): Sinus rhythm of 110 beats per minute; P-Q time 0.18 second; large and split P-waves. The initial complexes showed enlarged R_2 and R_3 as well as dextrogram. S-T intervals without remark. T-waves positive throughout.

Phonocardiogram showed a systolic murmur of 50 to 500 cycles per second; auricular sound and presystolic murmur 50 to 400 cycles per second.

Hypoxia test (9 per cent O_2 in 10 minutes): Pronounced depression of the S-T intervals in Leads II and III, and diphasic T_1 and T_2. After 15 minutes, the findings were the same as before the hypoxia test.

Since the first electrocardiographic examination on June 21, 1939, sixteen electrocardiograms and phonocardiograms have been registered. They all show distinct signs of mitral stenosis and have, on the whole, the same character as the one described.

Heart x-ray (July 9, 1945): The heart was clearly enlarged, breadth 12.8 cm., 9 cm. of which were to the left. Internal thorax diameter 22.5 cm. Heart volume 875 c.c., or 840 c.c. in relation to the body surface. The left ventricle bulged markedly to the left with a pronounced pulmonary arch, and considerable backward bulge. The vascular shadows within the hilus were large and showed a distinct hilus dance.

CASE 3.—(Fig. 8. Electrocardiogram 837/45.) The patient was a girl, 4 years old, with the following diagnosis: polyarthritis, acute, and myocarditis, acute. Sudden onset with subfebrile temperature and swelling of the small joints of the hands. Sedimentation rate, 62 mm. Physical examination revealed a child in good general condition. The heart showed no enlargement, pure sounds, and regular rhythm.

Electrocardiogram (Sept. 20, 1945): Sinus tachycardia of 130 beats per minute; P-Q time of 0.13 second. Initial complexes were not remarkable and showed no relative axis deviation. T_3 was diphasic. S-T intervals were distinctly depressed in Leads II and III.

Electrocardiogram (Sept. 25, 1945): Sinus rhythm of 95 beats per minute; P-Q time of 0.13 second; T-waves positive throughout; and S-T intervals negative.

Phonocardiogram revealed a third sound gallop to 175 cycles per second; and systolic murmur of 50 to 250 cycles per second.

Hypoxia test (9 per cent O_2 in 10 minutes): Distinct depression of the S-T intervals in Leads II and III, with diphasic T-waves.

A month later, the sedimentation rate had fallen to 14 mm., and the patient had improved.

Electrocardiogram (Oct. 25, 1945): Sinus rhythm of 90 beats per minute; P-Q time 0.13 second; T-waves positive throughout; and S-T intervals within normal limits.

Phonocardiogram still revealed a third sound gallop to 175 cycles per second.

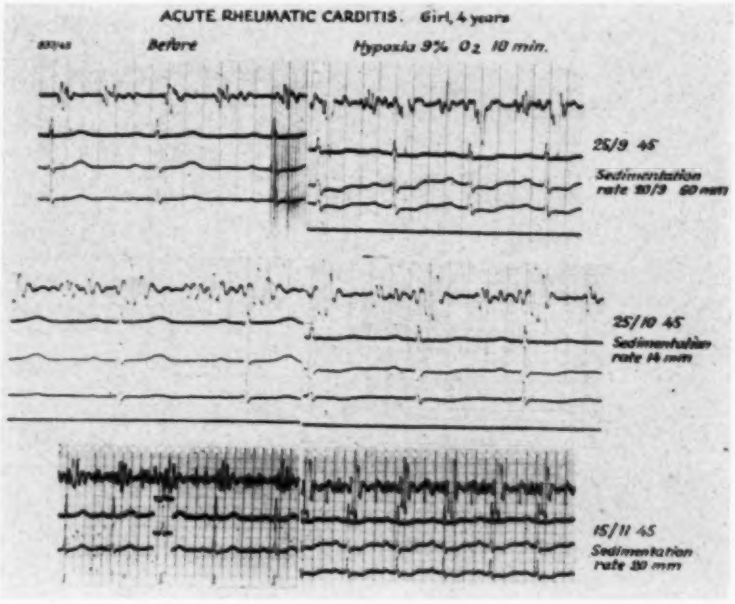

Fig. 8.

Hypoxia test (9 per cent O_2 in 10 minutes): Less pronounced depression of the S-T intervals and only indications of diphasic T-waves. After three weeks at home, there was a further slight deterioration. The sedimentation rate was 20 mm.

Electrocardiogram (Nov. 13, 1945): Sinus rhythm of 100 beats per minute; P-Q time of 0.13 second, and unremarkable initial complexes showing no relative axis deviation. T_3 was diphasic and the S-T intervals were within normal limits.

Phonocardiogram revealed a third sound gallop to 175 cycles per second.

Hypoxia test (9 per cent O_2 in 10 minutes): Still somewhat more depressed S-T intervals and diphasic T-waves.

Epicrisis: Acute polyarthritis of a fairly mild type, but with changes in the S-T intervals in the first electrocardiogram, and a sedimentation rate of 60 mm. The electrocardiogram became normal after about a week. Gallop rhythm remained and the hypoxia test was positive. Hypoxia test changes appeared to follow the clinical course, first with an improvement, and then with a more positive reaction in connection with a deterioration and elevated sedimentation rate.

CASE 4.—(Fig. 9. Electrocardiogram 1004/45): The patient was a girl, 5 years old. The diagnosis was patent ductus Botalli. Since the age of 2 years, a cardiac disease had been ascertained. She had always been delicate and small. She tired on exertion and had dyspnea and palpitation. She was admitted to the hospital on Oct. 18, 1945. Her weight was 15.1 kg., and height, 107.5 cm. Cardiac examination revealed a marked thrill over the entire heart; strong ictus; a whistling systolic murmur over the apex; and pronounced, typical, continuous murmur over the pulmonary orifice. She was operated upon (Crafoord) on Oct. 26, 1945. The procedure accomplished division of the canal.

Electrocardiogram (Oct. 18, 1945): Sinus rhythm of 105 beats per minute and P-Q time of 0.13 second. Initial complexes showed moderate relative right axis deviation and large R_2 and R_3. T-waves were positive throughout the S-T intervals were without remark.

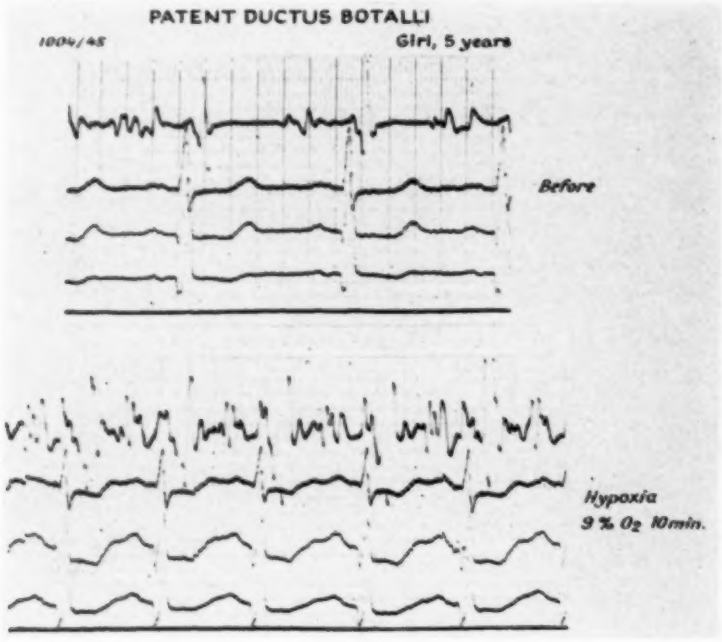

Fig. 9.

Phonocardiogram revealed a strongly continuous murmur of 50 to 500 cycles per second over the pulmonary orifice. A third sound gallop and systolic murmur of 50 to 500 cycles per second were noted over the apex.

Hypoxia test (9 per cent O_2 in 7½ minutes): Pronounced S-T interval depressions and diphasic T_2 and T_3.

Electrocardiogram (Nov. 9, 1945, after operation): Sinus rhythm of 110 beats per minute. P-Q time 0.14 second. Initial complexes showed less pronounced dextrogram. Diphasic T_3. S-T intervals slightly depressed in Leads I and II.

Phonocardiogram revealed a systolic murmur of 50 to 400 cycles per second. No continuous murmur.

Hypoxia test (9 per cent O_2 in 10 minutes): Pronounced S-T interval depressions and diphasic T-waves. During the hypoxia test a strong summation sound gallop was formed.

Heart x-ray (Oct. 19, 1945): The heart was enlarged and bulged strongly to the left and backward. There was bulging of the pulmonary arch. Frontal breadth, 11 cm., 8.5 cm. of

which were to the left of the midline. Internal thorax breadth, 17.5 cm. Cardiac volume, 340 c.c.; 520 c.c. per square meter of body surface. Enlarged vascular shadows.

Heart x-ray (Nov. 10, 1945, after operation): The heart had diminished in size, the breadth being 10.3 cm., 7.6 cm. of which were to the left. Cardiac volume equaled 285 c.c., or 430 c.c. per square meter of body surface. The posterior bulge was smaller.

Epicrisis: Patent ductus Botalli, possibly combined with a septum defect or functional mitral insufficiency. The Botalli canal was surgically ligated upon. The cardiac enlargement diminished, but the positive result of the hypoxia test remained unchanged a fortnight after the operation. The appearance of a gallop rhythm during the last hypoxia test was noteworthy. The progress of the patient will be followed with repeated hypoxia tests.

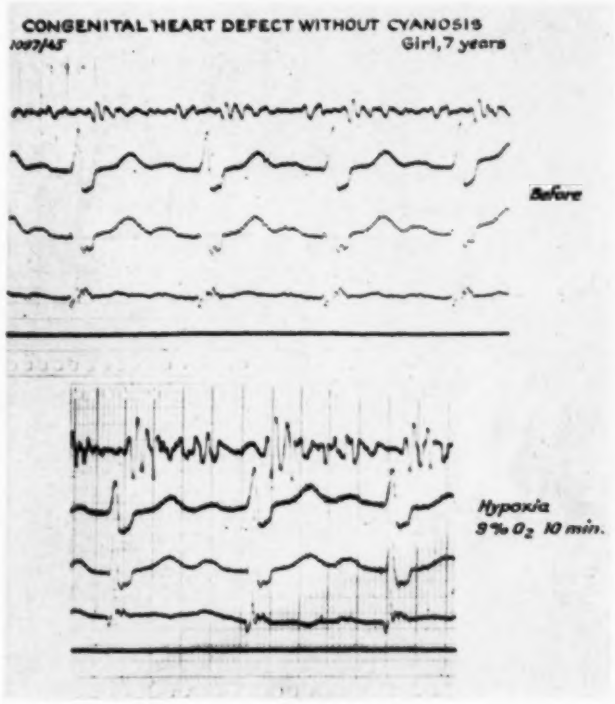

Fig. 10.

CASE 5.—(Fig. 10. Electrocardiogram 1097/45): The patient was a girl, 7 years old, with a diagnosis of congenital vitium without cyanosis (possibly a large septum defect). Since infancy, the cardiac disease had been diagnosed. The patient was thin, became out of breath, and had palpitations on exertion. There was no cyanosis. Cardiac examination: there was indication of voussure, a strongly systolic thrill, and an extremely marked systolic murmur was found which was maximal in the third and fourth intercostal spaces of the left of the border of the sternum.

Electrocardiogram (Nov. 1, 1945): Sinus tachycardia of 140 beats per minute. P-Q time, 0.18 second. Initial complexes showed deep S_1 and S_2 as well as notch formations. T-waves were positive throughout. S-T intervals were not definitely changed.

Phonocardiogram revealed an organic systolic murmur of 50 to 500 cycles per second.

Hypoxia test (9 per cent O_2 in 10 minutes): Tachycardia and diphasic T_3. No definite effect of the tolerance test was demonstrated.

Heart x-ray (Nov. 1, 1945): The heart was considerably enlarged. Breadth in the frontal picture equaled 12 cm., 7.6 cm. of which lay to the left of the midline. Internal thorax breadth, 20 cm. Heart volume, 495 c.c. or, in relation to the body surface, 550 c.c. The left ventricle bulged markedly to the left and the right contour was rounded. There was also a pronounced backward bulge. The hilus shadow with its vascular density was enlarged and diffusely delimited. Indication of stasis was found toward the bases. The examination revealed a congenital heart defect combined with an initial stasis.

Epicrisis: A moderately severe case of congenital vitium, possibly with a large septum defect. Initial electrocardiographic changes. Heart enlargement confirmed in the x-ray. No definite effect in the hypoxia tolerance test was noted.

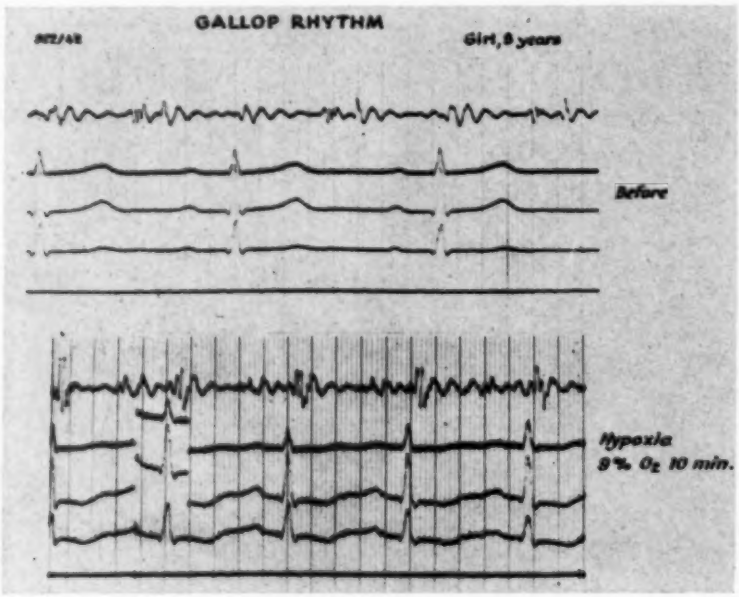

Fig. 11.

CASE 6.—(Fig. 11. Electrocardiogram 922/42): The patient was a girl, 5 years old. at the time of the first examination in November, 1942. The diagnosis was myocarditis, subacute, with a third sound gallop. In 1942, in the out patient department, a myocarditis was ascertained with a P-Q time of 0.18 second, and a pronounced third sound gallop was heard. Cardiac examination revealed a short systolic murmur and gallop rhythm at the apex. Afterward she progressed satisfactorily, possibly, however, with slight shortness of breath and fatigue at exertion.

Electrocardiogram (Sept. 22, 1945): Slight sinus arrhythmia of 60 to 80 beats per minute. Initial complexes were normal. P-Q time, 0.18 second. T_2 was faintly diphasic. S-T intervals were unremarkable.

Phonocardiogram revealed a faint systolic murmur of 50 to 250 cycles per second and a third sound gallop of 50 to 175 cycles per second.

Hypoxia test (9 per cent O_2 for 10 minutes): Depressed S-T segments and negative T_2 and T_3.

Heart x-ray (Dec. 15, 1944): Normal-sized heart when the child was erect, but a conspicuous increase in cardiac volume when in the prone position. There was no pathologic bulge nor pulmonary stasis.

SUMMARY

Present knowledge of latent cardiac decompensation in children is inadequate. Accordingly, an attempt has been made to come closer to the problem of the reserve forces of the child heart by means of a comparative investigation of the tolerance tests performed on healthy as well as on sick children.

For the tolerance test, respiration of air deficient in oxygen has been chosen, as applied earlier to adults by, among others, Dietrich and Schwiegk, Levy and Larsen.

A special apparatus suitable for children of all ages, as well as for adults, has been constructed. It consists of an adjustable metal ring with a hood of Plexiglas mounted on one of the ends of the bedstead. Oiled silk is attached to the metal ring which is applied to the shoulders, back, and chest of the patient. In the respiration chamber thus obtained, nitrogen and air are introduced, the oxygen content of which acquires the desired constant value after four and one-half minutes.

In the present test series, 9 per cent oxygen was used during ten minutes of tolerance testing.

The result, which is of a preliminary nature, is briefly as follows: Thirty normal cases reacted negatively. Sixteen of twenty-five cases of different heart diseases reacted positively. Seven of these cases represented active rheumatic carditis, four cases being patent ductus Botalli, one case another congenital vitium without cyanosis, one case of morbus ceruleus, and three cases of post-myocarditic conditions. In addition, a group of twenty-nine cases of third sound gallop has been subjected to the tolerance test; these patients have been examined by Carlgren and will be included in his work regarding the gallop rhythm. Nine cases (31 per cent) reacted positively, the twenty remaining, negatively. This result supports Carlgren's theory that the third sound gallop is, to some extent, to be considered a myocardial injury.

An examination of the T-waves during the hypoxia test has shown that a considerably more marked depression of the T-wave in all three leads occurred in the cases reacting positively than in those which were not affected by the respiration of air deficient in oxygen.

The pulse increased in rate during the tolerance test, both in normal and in pathologic cases. However, the data are still too limited to permit the drawing of any far-reaching conclusions.

The test, which is easy to perform, takes only 15 minutes, is free from risks, and will, no doubt, be found suitable for routine clinical work. In contrast to the working tests with registration of the cardiac effect after the completion of the exertion, the respiration of air deficient in oxygen, as in the present case, has the advantage that the heart's reaction can be recorded during the actual tolerance test. This is, in all likelihood, particularly valuable with regard to children, where the heart is characterized by a rapid mode of reaction. Thus, all the changes appearing during the hypoxia test, in normal as well as pathologic cases, had resumed their original value five minutes after the termination of the tolerance test.

For the purpose of studying more closely the effect of the hypoxia on the circulation, larger normal and pathologic series are being planned where, apart from electrocardiographic and phonocardiographic registrations and pulse recording, measurements of the oxygen-saturation of the blood will also be carried out.

Editorial Note.—It should be pointed out that various methods for producing anoxemia have been used for determining the efficiency of the coronary circulation and the response of the myocardium to anoxemia in disease of the coronary vessels, particularly in coronary artery occlusion.

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STRAMONIUM POISONING

A Diagnostic Problem With Psychiatric Implications

Lenore M. Sportsman, M.D.
Baltimore, Md.

IT IS a most hopeful sign that pediatricians are becoming more and more alert to the psychiatric implications of bizarre symptoms and ask for psychiatric consultation where such service is available. However, this not infrequently results in the presentation to the psychiatrist of cases of abnormal behavior whose etiology is organic in nature. It is not surprising that this group should include syndromes arising after the unknowing ingestion of portions of poisonous plants such as the ubiquitous *Datura stramonium*, commonly known as Jimsom weed.

Despite the prevalence of this potential source of danger, it is evident from a review of the literature and a survey of the diagnostic file in an active clinic that the pathologic state known as stramonium poisoning is not commonly recognized in this country. It is the purpose of this paper to present the reports of the two cases which have been seen in the Harriet Lane Home for Children of the Johns Hopkins Hospital and who, because of the bizarre nature of their clinical pictures, came to the attention of the Children's Psychiatric Clinic.

Case A.—J. H., a 9½-year-old Negro boy, was brought into the hospital in November, 1935, because of disorientation associated with combativeness.

Three hours prior to admission, he had appeared well except that he complained of a sore throat following a period of play out-of-doors, and displayed dysphagia when he attempted to eat.

Arousing from a very short period of sleep, he was confused, complained that he was giddy, and staggered as he attempted locomotion. His continuous stream of speech was irrelevant, he talked to persons not present, picked unseen objects out of space, and demonstrated no recognition of members of the family. Within an hour of the onset of this unusual behavior, he became "thick tongued," and exhibited fear which resulted in combativeness.

The developmental data, personal history, and family history were essentially noncontributory.

Upon physical examination, the boy was observed to be extremely restless, apprehensive, completely disoriented, and talking incessantly. The other findings of significance were markedly dilated pupils which did not react to light and accommodation, a very dry tongue, and slight motor incoordination as he walked.

The only other departure from normal was a white blood count of 12,840, with a normal differential. Examination of spinal fluid revealed no pathologic deviation.

Despite sedation, there was little reduction of delirious activity for the first twelve hours. Following a period of six hours' sleep, he awoke completely oriented and calm, and presented amnesia for the events of the preceding day.

A psychiatric examination revealed an alert, cooperative, affable boy, somewhat elated with all the attention he received. He was perfectly oriented in all three spheres. His remote memory was good as was that for recent events, except for the day of admission.

About this he stated that he knew only what he had been told, that he ate something which poisoned him, but he could not remember what. He denied any recollection of an injury, fright, or unusual experience prior to the onset of illness. At this time no evidence of either affective or organic disorder was present.

For the remainder of his four-day hospital stay, there was no recurrence of any psychic disturbance or evidence of any further physical abnormality. Just prior to discharge, the father reported that on questioning the patient's companions, it was disclosed that during the morning preceding the onset of his symptoms, the gang had sampled some "wild horsechestnuts." The patient only had found them tasty. The social worker, accompanied by the boy's companions, procured a pod from the vegetation under question. Analysis proved it to be *Datura stramonium*.

CASE B.—L. N., a 3½-year-old, Negro child, had been well except for a slight cold until about seven hours prior to admission in October, 1945. The child was found on the steps of the home complaining of inability to walk. When offered food, she seemed unable to swallow. In a short time, she complained of pains in her legs and appeared frightened. She called to her mother, but indicated by her actions that she could not see or did not recognize her. Shortly thereafter, she presented signs of delirium, spoke to and called names of people not present, picked at the carpet, carrying imaginary articles to her lips, and attempting to pick the flowers out of the fabric on the upholstered chair.

A local physician was called and, suspecting poliomyelitis, sent her to the contagion hospital. There, upon physical examination, the only abnormality discovered was a greenish foreign body in the right ear canal. This was removed. Examination of the spinal fluid revealed nothing pathologic.

Upon transfer to the Harriet Lane Home, she was totally oblivious to her surroundings. No contact could be established with the patient by either staff or parents. She was confused and in constant motion. At times her incessant activity appeared purposeless, but often she engaged in pantomime of dressing and undressing or of feeding herself. Speech was largely incoherent but incessant. She was actively resistant to examination procedures. When placed on the floor, she stood on a wide base unsteadily with body slightly inclined forward. Locomotion was slow and ataxic. However, she was not inclined to fall.

Examination revealed pupils round, regular and equal, widely dilated with sluggish light reflex. No strabismus or nystagmus was present. No other significant deviations from normal were observed during complete physical and neurological examinations.

A definite diagnosis could not be established on admission. The child was placed on sedation for the first night. The following day she was less restless, but continued to be unresponsive.

Because of a slight amount of serous drainage from the right ear (from which a foreign body was removed) the patient was placed on sulfadiazine for three days. This drug was discontinued because of oliguria. However, the eardrum showed no further signs of inflammation.

The patient was allowed to be out of bed after the fourth day. She continued to be unresponsive to the staff, wandered about in an aimless, somewhat dazed fashion, or sat quietly engaged in repetitious manipulation of a toy or her own fingers.

She recognized her parents when they visited her on the sixth day, but was considered by them to be "far away and certainly not herself." She did speak to them in a listless manner, quite contrary to her accustomed enthusiastic prattling.

For the next four days the child showed little change; she was withdrawn, noncommunicative, phlegmatic in her solitary play, rarely participating in the playroom activities with the other children. On the tenth day, psychiatric consultation was sought because it was believed that the child suffered from an affective disorder or mental retardation.

The mother, a young, alert, energetic, intelligent woman, was interviewed. Essentially the same story of the present illness was obtained. Further it was learned that the patient had always been an active child, whose development had proceeded normally. She

had never been considered nervous or presented any unusual behavior problems. She had displayed anger when frustrated, then was inclined to play alone for a while, but readily recovered from her sulkiness. She had never required severe discipline or any more attention than the other three siblings. She had always been timid and retiring with strangers, even children, but was considered a talkative child at home. Assessment of her habits revealed that she was subject to pica, and often gnawed at the varnished bed. Moreover, a 12-year-old neighbor girl reported that on the morning the patient became ill, she had observed the child chewing on a weed which she had promptly discarded. The mother was inclined to discount its significance.

During the initial psychiatric contact, the patient completely ignored most attempts on the part of the examiner to establish contact. She sat immobile except for a desultory manipulation of the fingers of the hand extended in an effort to attract her attention. With the mother, she was slightly more responsive, smiled shyly, spoke a few words in reply to the mother's questioning, and wailed when the mother departed.

A trip was made to the home where the neighbor child pointed out the remainder of the plant from which the child had eaten a pod. This was unmistakably *Datura stramonium*. This lent additional weight to the postulation that the child was victim of stramonium poisoning.

She was seen on two succeeding days and on each occasion she was in good contact. She indicated a recognition of the examiner and various members of the staff. She continued largely uncommunicative except under strong stimulus, i.e., venae puncture or a conflict with another child.

By the fifteenth day, her behavior was essentially normal; she was alert, affable, and she no longer indulged in meaningless, repetitious activity. Accordingly, she was discharged, apparently fully recovered.

DISCUSSION

Jennings[1] has contributed an exhaustive consideration of the subject of stramonium poisoning. Including a review of the literature and a concise discussion of the pharmacology, he described the classical and extraordinary features of the onset, course, and prognosis of this malady. Then he presented two cases as evidence of the ease of diagnosis and treatment when this potential source of poisoning is recognized.

In view of that excellent presentation of the many aspects of the problem, only the salient features exhibited by our two patients will receive attention herein.

The symptoms and signs observed appeared in both patients in the same order. Primarily there was inability to swallow. Disorientation soon ensued, associated with delirium in which the plucking phenomenon was a predominant feature. Widely dilated pupils which did not react to light were observed on initial examination. As the acute phase receded, amnesia replaced the delirium and in the second child, an associated perseveration was observed.

As assembled here, the symptoms would seem to lead to an unequivocal diagnosis of an organic disorder. However, the fact that they were viewed in another light merits consideration. It is not inconceivable that each of these symptoms separately might be observed in an affective disorder, but it would be rare to meet them in aggregate.

The plucking sign, so prominent a feature in both cases, is a phenomenon frequently observed in toxic delirium. When this is present one must consider the toxic state as a possible cause of the symptoms complex, despite the

temptation to the psychiatrically alert to interpret this evidence of visual hallucination as sufficient basis for labelling the state purely enigmatically "mental."

Both case histories place emphasis on the extreme apprehension and excitability exhibited by the children. Even though widely dilated pupils may be observed in a severe panic state, the persistently nonreactive dilated pupil is so constantly an incontestable sign of an organic reaction that no other explanation should be sought.

Amnesia and perseveration are aberrations of grave significance because they are indicative of organic brain damage. The appearance of these symptoms, in fact, is ascribable to transient insult to cerebral tissue by the toxic agent. In this instance, it is not the stramonium which is responsible for the symptoms. The *Datura stramonium* seed is known to contain, in addition, a variable amount of scopolamine.

It was discovered in both cases seen by us that the seeds had been swallowed. Both patients, at first, presented maniacal and delirious behavior, followed in the one case by amnesia for one day only, and in the other by amnesia associated with perseveration which continued for several days. It has been determined that the effects of the ingestion of this vegetation are varied according to the quantity and portion of the plant consumed.

The symptomatology of stramonium poisoning classically presented by standard texts is precise and definitive. This being true, one is moved to determine why the picture may be improperly evaluated.

In the first place, this disorder is so uncommonly met that the diagnostician may fail to call it to mind.

Both patients seen in this clinic dwelt in less desirable sections of the city and played, unsupervised, on overgrown lots. It is apparent that the syndrome will be observed more frequently in children who live in the areas where uncultivated vegetation is rank. It is obviously not a disease of the residents of restricted zones of the city.

It may be postulated that unwary rural inhabitants may partake of this agent and suffer transient noxious effects more frequently than is recorded. It is a common practice for the city bred to seek readily accessible medical attention at the onset of abnormal behavior in contradistinction to the conservative inclination of the agrarian to await developments.

Providing the possibility of poisoning is considered by the examiner, a cursory assessment of the history may fail to reveal any probable chance for stramonium or atropine ingestion. Therefore this consideration is pre-emptorily abandoned as not feasible because of lack of knowledge that the Jimson weed is a potential source of poisoning.

Because these symptoms, in general, may be those of a nonspecific toxic state, such as may be encountered in bacterial infections, it is not remarkable that the physician's mind-set precludes consideration of other possibilities. However, when the lack of the traditionally anticipated antecedent or concurrent clinical picture proves frustrating, the case is likely to be dismissed with an equivocal diagnosis: cause unknown.

On the other hand, the diagnosis may be missed because of the antecedent history of a chronic disease such as was thought to be present in Case B. This tempts the examiner to attribute the present symptoms to a complication of the pre-existing disease and stultifies rational, unbiased consideration of the problem in its acute and modifiable stage. This failure to exercise objective acumen derives from professional indoctrination with the time-worn diagnostic axiom, that to seek a plurality of causes for a clinical picture is deplorable.

It is understandable that in a busy clinic, scientific curiosity may be curbed when the therapeutic exigencies are abbreviated by the self-determined course of the disorder. However, the harried clinician should not feel justified in tossing into the psychiatric wastebasket all those cases which do not fit readily into his roster of organic disorders. More especially is this true when delirium is associated with other signs of neurological impairment, such as dilated pupils, inability to swallow, and ataxia. These constitute the picture of an intoxication and should spur the examiner to determine the cause, no matter how cryptic.

SUMMARY

The phenomonology observed following ingestion of *Datura stramonium* seeds may be incorrectly interpreted as evidence of an affective disorder. The establishment of the correct diagnosis often depends on medical sleuthing to determine the source of intoxication.

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ATTEMPTS TO ADAPT MURINE POLIOMYELITIS VIRUS TO THE CHICK

PAUL BRUTSAERT, M.D., CLAUS W. JUNGEBLUT, M.D., AND ALICE KNOX, B.A.
NEW YORK, N. Y.

INTRODUCTION

ONE of the outstanding properties of the viruses belonging to the poliomyelitis group, characteristic of natural and experimental infection with human or rodent strains, is the narrow adaptation of the infectious agent to its respective host. Thus, human virus, with rare exceptions, produces disease only in man or monkeys; similarly, the corresponding mouse virus (Theiler virus) is usually virulent only for rodents. Viral strains, however, which have been experimentally acclimated from man or monkeys to rodents or from rodents to monkeys, occupy an intermediate position in that they exhibit varying degrees of monkey *and* rodent pathogenicity in consonance with the extent of the induced biologic variation. This "monopathogenicity" of poliomyelitis virus is, of course, more apparent than real. For virus-host relationship is not limited to the production of paralysis but finds its expression also in the development of subclinical lesions or in the various states of latent infection that are demonstrable by virus recovery, antibody response, resistance to reinfection, as well as protection against primary infection through interference. Yet, for all practical purposes, the restriction in the disease-producing power of poliomyelitis virus is striking[1] and in marked contrast to the wide pathogenic host range of other neurotropic viruses that are easily transmissible to a number of laboratory animals and grow in standard chick tissue culture media or in embryonated hens' eggs.

Previous studies with two mouse-adapted strains of human poliomyelitis virus (SK, MM)[2, 3] serve to illustrate what has been said. For instance, SK murine virus, which combines residual pathogenicity for monkeys with marked virulence for rodents (mouse, cotton rat, hamster, guinea pig), fails even to survive in rabbits. When propagated in tissue culture, serial passages at high titer (10^{-5}) can easily be maintained in media prepared with embryonic mouse brain but substitution of minced chick tissue yields poor growth (10^{-1}). No active virus can be recovered from inoculated chorioallantoic membranes and the virus is not demonstrable beyond the second egg passage. These facts are, in general, duplicated by experience with the more rodent-virulent MM virus. Thus, MM murine virus, while even less pathogenic for monkeys, is extremely potent for rodents (mouse, cotton rat, hamster, guinea pig) but at the same time altogether harmless for rabbits. The virus attains an extraordinarily

From the Department of Bacteriology, College of Physicians and Surgeons, Columbia, University.

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high titer (10^{-9}) on serial passage in embryonic mouse brain tissue culture, whereas minced chick tissue supports considerably less growth (10^{-5}). In contrast to SK virus, however, MM virus has been carried successfully over five serial passages in the fertilized hen's egg.

The apparent ability of MM virus to maintain some rate of active propagation on chick tissue was made the subject of further study. Assuming that full adaptation could be accomplished, it was conceivable that live avian virus might be used as a protective agent against infection in monkeys with a greater margin of safety than live murine virus. Further interest in the problem was stimulated by the alleged relationship between paralytic epizootics in chickens and human epidemics of poliomyelitis, as described by Preioni[4] and more recently emphasized again by Rillo and Lagrotta.[5] The work to be reported deals: (1) with attempts to propagate MM murine virus serially in the developing chick embryo, and (2) with experiments designed to adapt MM murine virus to young chicks.

EXPERIMENTAL WORK

I. Attempts to Propagate MM Murine Virus Serially in Embryonated Eggs.—In these experiments 8- to 9-day-old embryonated eggs were inoculated by the allantoic route with 0.1 c.c. of 10 per cent MM viral mouse brain suspension or with 0.1 c.c. of chick embryo tissue culture virus. Following incubation at 35° C. for 4 to 5 days, further passages were made by transfer of undiluted allantoic fluid or of 10 per cent embryonic brain suspension to new eggs. The presence of virus was tested at frequent intervals by titrating the transfer fluids in mice intracerebrally and intraperitoneally. All in all, six attempts were made to establish MM murine virus in serial egg passage. The results obtained are shown in Table I.

The table demonstrates the extreme irregularity in the ability of MM virus, harvested from different mouse brain passages, to propagate in em-

TABLE I. PROPAGATION OF MM MURINE POLIOMYELITIS VIRUS IN SERIAL EGG PASSAGES

EXPERIMENT	SOURCE OF MM VIRUS	EGG PASSAGES									
		I VIRUS CONTENT	II VIRUS CONTENT	III VIRUS CONTENT	IV VIRUS CONTENT	V VIRUS CONTENT	VI VIRUS CONTENT	VII VIRUS CONTENT	VIII VIRUS CONTENT	IX VIRUS CONTENT	X VIRUS CONTENT
1	46th mouse passage (10^{-9})	10^{-1} A		10^{-0} A 10^{-1} B	10^{-0} A	10^{-0} A 10^{-1} B	10^{-0} AB	– AB			
2	61st mouse passage (10^{-9})	10^{-7} A	10^{-5} A	10^{-7} AB	10^{-6} AB	10^{-2} AB	– AB	– AB	– AB	– AB	– AB
3	62nd mouse passage (10^{-9})	10^{-4} A 10^{-5} B	– AB	– AB							
4	66th mouse passage (10^{-9})	10^{-4} A 10^{-4} B	– AB	– AB							
5	68th mouse passage (10^{-9})	10^{-2} A 10^{-3} B	– AB	– AB							
6	8th serial passage of chick embryo tissue culture (10^{-5})	– AB	– AB								

A = allantoic fluid tested; B = brain suspension tested; AB = mixture of allantoic fluid and brain suspension. The figures given with these symbols indicate maximum potency as determined by intracerebral and intraperitoneal titration in mice.

bryonated eggs. Thus, in two experiments serial transmission could be maintained over 5 or 6 passages, whereas in three other experiments transfers did not succeed beyond the first passage. No striking difference was found between the virus content of allantoic fluid or that of embryonic brain. Noteworthy is the fact that even virus, pregrown in minced embryonic chick tissue culture at fair titer, failed to propagate in the first egg passage. The results are, therefore, in agreement with earlier observations[3] that MM murine virus may grow in initial transfer to embryonated eggs but cannot be maintained beyond the fifth or sixth serial passage.

II. Attempts to Adapt MM Murine Virus to Young Chicks.—Young chicks were injected intracerebrally (or intracerebrally and intraperitoneally) with murine virus harvested from the brains of mice paralyzed by MM mouse-passage virus. Of the injected chicks a number were kept for a period of 4 weeks to observe the development of symptoms, whereas the remaining ones were sacrificed at certain early intervals (24 hours, 48 hours, 72 hours) for the purpose of transferring intracerebrally in "blind passage" a suspension prepared from their brains or cords to new chicks. In this second transfer, and in all later transfers, the same principle was followed in that some of the injected chicks were again retained in order to permit the development of symptoms while others were killed symptomless at similar intervals for further transfer of brain or cord to new chicks. All in all, four serial chick to chick passages were thus maintained. Since earlier experience had demonstrated the frequent presence of *Salmonella pullorum* infection in young chicks purchased on the market, the chicks used in these experiments were supplied by a dealer from a tested hatchery. The animals varied in age between 1 and 7 days.

In the first experiment a total of 15 chicks received intracerebrally 0.06 c.c. of a 10 per cent viral mouse brain suspension (twentieth mouse passage). Six chicks were sacrificed for "blind passage" after 24, 48, and 72 hours, respectively, while 9 chicks were retained to study the primary infection. In the latter group of 9 animals, 6 chicks died with indefinite symptoms within 3 to 5 days; one chick developed, on the twenty-fifth day after inoculation, a paralysis of the right leg; and 2 chicks survived without any symptoms. Passages of brain and cord suspension from the 6 dead chicks to new chicks were negative, except for one transfer which caused paresis in 1 of 3 injected chicks after an incubation period of 24 days. This condition, however, could not be reproduced in a subsequent passage. Similarly, it proved impossible to transmit to new chicks the paralysis produced in one chick by the original virus inoculation. There was also available for further study another group of 15 chicks representing animals which had been retained from "blind passages" carried out at the 24, 48, and 72 hour cycles. All of these animals remained well, excepting 6 chicks, i.e., 3 chicks from the 24 hour cycle, first or third transfer; 2 chicks from the 48 hour cycle, third transfer; and 1 chick from the 72 hour cycle, second transfer. These 6 chicks showed the same paretic or paralytic leg involvement after incubation periods varying from 17 to 24 days.

In no case was it possible to further transmit this condition to new chicks. The chicken paralysis is illustrated in Figs. 1 and 2.

Although definite paresis or paralysis was observed in a total of 8 inoculated chicks, the nature of this condition remained uncertain, particularly since it proved nontransmissible in serial chick passages. Was it due to (a) nutritional deficiency, (b) intercurrent bacterial infection, (c) latent virus disease, or (d) was it etiologically connected with the activity of MM virus? The first two possibilities can probably be excluded since the chicks were fed an adequate standard diet and blood as well as tissues were uniformly found sterile by bacteriologic examination. The chance that we were dealing with a latent infection of avian encephalomyelitis seems also remote even though the clinical picture of the observed paralysis resembled in many ways the spontaneous

Fig. 1. Fig. 2.

Fig. 1.—Chick with paresis of left leg following injection with MM murine poliomyelitis virus in the second chick passage (transfer from dead chick of first passage.)

Fig. 2.—Chick with paresis of left leg following injection with MM murine poliomyelitis virus in the second chick passage (transfer from blind first passage, twenty-four-hour cycle).

virus disease described by Olitsky.[6] For paralysis was never produced in control experiments in which chicks were injected with normal mouse brain, normal chick brain, or heat-killed MM virus, including serial blind passages. On the other hand, certain facts provide circumstantial evidence to suggest that the chicken paralysis was actually induced by MM virus. Thus, murine virus of low potency could regularly be recovered by transfer to mice from nervous tissue, occasionally also from blood and spleen, of chicks following primary intracerebral inoculation with MM virus during the first 96 to 120 hours after infection even though brains harvested from subsequent chick passages were uniformly free from any mouse-pathogenic agent. Occurrence of a viremia in these chicks, irrespective of the absence or presence of symptoms, compares closely with similar observations described by Hammon, Reeves, and Burroughs[7] for chickens, following injection of Japanese B encephalitis virus, and leaves

little doubt that systemic infection had taken place. Furthermore, neutralization experiments (intraperitoneal injection of mice with virus-serum mixtures) were carried out with one serum from a paralyzed chick and with two sera from nonparalyzed chicks, all of which had been injected with original live mouse virus. All three sera were capable of inactivating large doses of MM virus (100,000 paralytic doses); however, doubtful (10 paralytic doses) or no neutralization occurred with five sera collected from asymptomatic passage chicks. Normal chicken serum failed to neutralize the virus. When present, virucidal antibodies could be demonstrated at undiminished titer in repeated tests for as late as two months after the original infection. The available data, therefore, strongly suggest that at least the symptoms observed in infected chicks of the first passage were caused by activity of MM virus.

The above experiment was repeated: (1) with another specimen of MM murine virus (thirty-third mouse passage), (2) with MM murine virus grown in tissue culture prepared either with minced embryonic mouse brain (fifty-first passage) or with minced embryonic chick brain (twelfth passage), (3) with virus grown in embryonated eggs (first passage or fourth passage). The results were: (1) Among a total of 40 chicks inoculated with MM viral mouse brain not a single chick was observed with paralysis; however, three sera collected from symptomless chicks after primary infection with MM virus again contained large amounts of virucidal antibodies (10,000 to 100,000 paralytic doses neutralized). No paralysis was observed in "blind passage" chicks and no antibodies were present in the serum of such animals. (2) Among a combined group of 29 chicks inoculated with either mouse embryonic or chick embryonic tissue culture virus not a single chick was observed with paralysis. Neutralization tests demonstrated the presence of small amounts of antibody (100 paralytic doses neutralized) in the sera of two of these animals. (3) Allantoic fluid with a virus content of 10^{-1}, transferred from the first egg passage, failed to produce any symptoms in 3 chicks, but allantoic fluid with a virus content of 10^{-6}, transferred from the fourth egg passage, produced paralysis in 1 of 3 chicks on the third day after intracerebral inoculation. The animal was killed on the same day and a brain-cord suspension was transferred to mice and new chicks. Even though all the mice died with typical paralysis following injection with high dilutions (10^{-5}), the disease could not be transmitted to new chicks.

DISCUSSION

The data presented in this paper bring into sharp relief, once more, the extreme dependency of poliomyelitis virus in its growth requirements upon a given host. While it is possible, on occasion, to force a mutation* in the infectious agent so that it will propagate in the tissues of another unrelated host, in most instances such attempts result only in abortive infections. Almost always the experience leaves the virus with a markedly depressed parental

*The term "mutation" is used here in a general sense to designate a biological process which causes the virus to display new properties such as enhancement of virulence or ability to multiply in foreign tissues with or without the production of lesions. It is a reasonable assumption that these new properties make their appearance because of hereditary selection of one variant at the expense of the other in a virus entity which originally contained both variants in fixed proportions.

virulence with no compensatory gain in foster virulence. Experimentally, and perhaps also epidemiologically, such transfers will therefore cause merely isolated cases of disease in the new host which fail to transmit in series.

There is close agreement between the results obtained in this work and the trend of similar observations made in attempts to adapt murine poliomyelitis virus (SK strain) from albino mice to guinea pigs. Only seldom are the conditions sufficiently favorable to permit the establishment of a fixed cavian strain of virus.[8] Nor do they differ very much from the problem involved in the successful transfer of simian virus to rodents or of rodent virus to monkeys.[9] What deserves special emphasis, however, is the fact that chick tissue, commensurate with its grade of biologic differentiation, apparently offers uneven chances for viral adaptation. Thus, fair growth may be secured in serial transmission of tissue culture media which utilize minced embryonic chick brain as a substrate; the intact embryo in the egg, on the other hand, supports viral propagation only at a poor rate over a measured series of passages. In the hatched chick, finally, virus activity reaches merely the threshold of latent infection; development of paralysis is rare and in no case has it been possible to establish a fixed avian strain of virus. It should be pointed out, however, that, unlike the rabbit, the chick may ultimately prove not to be a completely refractory host since active virus has always been recovered from animals of the first passage.

SUMMARY AND CONCLUSIONS

1. Experiments in which embryonated eggs were inoculated with MM murine poliomyelitis virus demonstrated the possibility of viral propagation in initial transfers, but active virus could not be recovered beyond the fifth or sixth serial egg passage.

2. Inoculation of young chicks with this strain of virus, as a rule, produced no paralytic symptoms. However, in several instances the infected birds developed flaccid paralysis of the legs after a variable incubation period. No fixed avain strain of virus could be established in subsequent serial chick passages.

3. Irrespective of the absence or presence of symptoms, primarily injected chicks harbored active virus in brain, blood, and spleen and their serum contained specific neutralizing antibodies.

4. The reported data illustrate the flexibility in the pathogenic properties of the virus when passage is attempted from one host to another.

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NEWER AGENTS IN THE TREATMENT OF EPILEPSY

WILLIAM G. LENNOX, M.D.
BOSTON, MASS.

EPILEPSY is slowly emerging from the doghouse of professional bewilderment and defeat. The increasing speed of its release can be measured by the intervals of time which separate the discovery of effective antiseizure drugs. From the caveman to bromide, many thousand of years; from bromide to phenobarbital, seventy-five years; from phenobarbital to diphenylhydantoin, twenty-five years; from diphenylhydantoin to trimethyloxazolidine dione, eight years. At this threefeld rate of acceleration, we should have yet another effective remedy by the spring of 1948!

Today we may consider, first, the therapeutic agents recently acquired, and, second, those which we may have in the future—given the needed research brains and money.

PREVENTION

Prevention has priority over remedial treatment and applies to both genetic and acquired causes. As for genetic prevention, electroencephalography is of potential aid in the detection of a transmitted predisposition to seizures. Brain wave tracings provide at least one leg for eugenics to stand on and give to the present-day physician a certain degree of confidence when he is asked to advise about marriage and children.[1] Prevention of certain acquired conditions (birth injuries, encephalitic-producing infections, traumas) may allow even a predisposed child to remain outwardly and clinically "normal." Finally, the potential epileptic, one with subclinical electroencephalographic seizure discharges, may be given drug therapy for the prevention of possible seizures.

PSYCHOLOGICAL-SOCIAL TREATMENT

Emotional and psychological wreckage is strewn about the long-standing public horror of epilepsy. Fear of public exposure, of expulsion from school, of losing friends, and opportunities for future marriage and employment, prey on parents and on teen age patients alike.

Psychological treatment has received a great impetus, and physicians a needed lay support, through the educational activities of the recently organized American Epilepsy League.* The skeleton is out of the closet. The word epilepsy can be spoken aloud in the consulting room and printed in papers and magazines. Warm hope is gradually ameliorating the chill atmosphere of popular despair.

NEUROSURGICAL TREATMENT

Physical treatment by means of neurosurgery is not new, but recent progress has been made in matching the symptoms of a seizure with the responsible areas of the brain, in delimiting this epileptogenic focus, and in removing it with minimal damage to the neighboring tissues.[2, 3] Neurosurgeons are now leaving

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*Address: 50 State Street, Boston, Mass.

the scar alone, and instead are excising normal-looking brain tissue, possibly distant from the scar, which harbors the abnormally discharging neurons. In this work of detection the electroencephalogram plays a significant role.

THE ELECTROCEPHALOGRAPH

In many specialties, laboratory techniques have lifted treatment to new levels of precision and success. Think of the orthopedist without the roentgen ray, the syphilographer minus the Wassermann test, the cardiologist deprived of the electrocardiograph. For bewildered physicians who diagnose and treat epilepsy, the electroencephalograph is a gift, via Germany, from the gods. Graphic recording of the electrical activity of the surface of the brain gives six-fold assistance.

1. Epilepsy is manifested as a disturbance in the rate and the voltage of electrical potentials of the brain.

2. The area of the cortex which is "firing" seizure discharges can often be identified, either from electrodes placed on the scalp or, more precisely, on the cortex. Stimulation of the exposed cortex with a current too weak to produce clinical symptoms will set up telltale electrical discharges in the epileptogenic area, thus identifying the portion of the brain to be removed.[5]

3. Each of the three main types of clinical seizures is accompanied during the seizure by a different type of high voltage electrical waves; fast (grand mal); slow (psychomotor); alternately fast and slow (petit mal).

4. In seizure-free periods, the quality and quantity of abnormal waves helps to measure the severity of the epilepsy and, on repeated tests, the success of therapy.

5. The pattern of the waves, their frequency and voltage, whether normal or abnormal, can be altered by chemical means, for example by the acidosis produced by ketosis or by mental activity.

6. Evidence is dawning of specific chemical therapy for specific abnormal wave formations. The alternate three-per-second dart and dome formation is particularly susceptible to acid-base changes and to medication with trimethyl-oxazolidine dione.

CHEMICAL THERAPY

Our principal interest as physicians centers about the possibility of inhibiting or perhaps abolishing seizures by chemical means. Convulsions and epilepsy are predominantly problems of infancy and childhood. Pediatricians (Geyelin, Peterman, Helmholtz, Talbot, Gamble) were the first to take the fad of fasting into the laboratory, convert it to the ketogenic diet and analyze the reasons for its success in controlling seizures. Unfortunately, the attention span of pediatricians proved to be unduly short, as is suggested by the fact that of the last 652 articles on the subject of epilepsy, only 10, or less than 2 per cent, have appeared in journals devoted to the problems of children.

Out of these early dietary and metabolic studies came demonstration of the inhibiting effect not only of ketosis but of acidosis, however produced. These findings have brought scientific explanation and backing to a policy of keeping

epilepties in circulation, actively busy in sports or in climbing the educational ladder. The carbonic acid and the lactic acid which result from muscular and mental work are as important as drugs in the inhibition of seizures. Not stagnation, but productive activity is the password to a life with fewer seizures and more happiness. Laboratory demonstration of the triumph of mind over matter is shown in the accompanying figure. When this patient was sitting idly with eyes closed, alternate dart and dome discharges of petit mal were almost continuously present. When her eyes were open and she studied a picture on the wall, the abnormal discharges disappeared. This phenomenon has been pointed out before.[4]

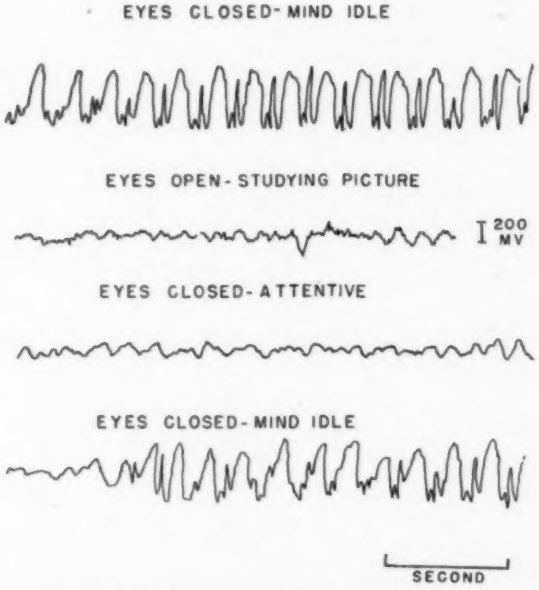

Fig. 1.—Effect of brain activity on petit mal seizure discharges. During the first of the examination, the patient, J. W., sat with eyes closed and mind idle. Spike and wave formations (first line) were almost continuous. With eyes open and studying a picture on the wall (second line), the abnormal waves disappeared. They did not recur when the eyes were closed but she was attentive to conversation (line three). On sitting for half a minute with mind vacant, the petit mal dysrhythmia returned. (last line). Recordings were from the left frontal area. The signal at the right marks 200 microvolts, the line at the bottom one second of time.

DRUG THERAPY

The benefit derived from the ingestion of a few decigrams of a selected chemical may exceed that of a laboriously sustained dietary ketosis. Furthermore, a seemingly slight alteration in the structural formula of a compound may benefit a different type of seizure or produce different side effects. With the coming of new drugs, the physician's prescription may be tailored to fit the particular type of seizure involved.

Three relatively new drugs may be named.

1. *Sodium Diphenylhydantoin* (phenytoin or dilatin sodium) is now eight

years old but many practitioners do not secure maximum benefit for their patients because of inadequate dosage or failure to follow their patients closely. The gap between the amount of the drug which gives freedom from seizures and that which produces annoying muscular incoordination or other disturbing side effects may be a narrow one. Trial of this drug cannot be considered a failure unless the point of tolerance has been reached. Pediatric literature tells little about the therapeutic and toxic effects of this drug in children as contrasted with adults. It is the drug of choice for grand mal or psychomotor seizures, although phenobarbital may be given first trial. Psychomotor seizures are common enough in children, though usually called petit mal or behavior disorder. Diphenylhydantoin is most likely to stop psychomotor seizures, but petit mal seizures are increased as often as relieved.

2. *Methylphenylethylhydantoin.* This drug (called mesantoin by Sandoz, the manufacturers) is not yet on the market. The results obtained by my colleague, Harry L. Kozol, in the treatment of 115 patients are reported elsewhere.[5] In a group of 30 patients, personally supervised, six, or 20 per cent, have obtained far greater relief from methylphenylethylhydantoin than from other drugs. An advantage over diphenylhydantoin is the absence of the side effects of muscular incoordination or hyperplasia of the gums. Disadvantages are the more frequent skin reactions and greater sedative effect. Convulsive but not petit mal seizures are aided. Because of side effects full dosage needs to be approached gradually. It is dispensed in 0.1 Gm. tablets. Older children may be given 0.2 to 0.6 Gm. daily. Methylphenylethylhydantoin is welcomed as a possible substitute for phenobarbital or diphenylhydantoin when the lack of therapeutic results or toxic reactions requires a change.

3. *Trimethyloxazoladine dione.* The trade name used by Abbott is Tridione. This drug, which has been reported[6] is a surprising addition to our armamentorium. The surprise is on three counts.

First, is the drug's relative specificity for seizures of the petit mal triad, seizures not usually influenced by the anticonvulsants. These three sorts of seizures are petit mal (or pykno-epilepsy), myoclonic jerks, and akinetic (loss of posture) seizures. Looking at these seizures from the level of the cortex, they are changes of potential characterized by an alternate spike and wave formation of the electroencephalogram. Pediatricians should especially welcome this medicine, for members of the petit mal triad are disproportionately prevalent in children and youths.

The second surprise is the high proportion of patients relieved, and the pronounced reduction in the number of seizures. The sudden disappearance of transient blackouts or falls which recur many times every day is, of course, more dramatic, although no more welcome, than the disappearance of a monthly or a bimonthly convulsion. A patient with petit mal will, say, have 300 or 400 one month and, on medication, none the next. The average grand mal patient rid of this many convulsions would be seizure free for several years.

Third, is the unexpected and as yet unexplained photophobia which accompanies the use of tridione in about one-third of the patients. Young children seem to be relatively immune to this annoying side effect.

During the past two years, we have given tridione to 145 patients of all ages, who have a history and, almost without exception, electroencephalographic evidence of one or more of the petit mal triad. All of these patients were having daily seizures, from several to scores of attacks every day. None had received important or prolonged benefit from the use of other drugs.

Thirty-five of these patients also had frequent grand mal. In addition, tridione was given to 32 patients who had frequent grand mal or psychomotor seizures without complicating petit mal. The accompanying tabulation gives the percentage of persons receiving different degrees of benefit for the two groups of seizures, first, those of the petit mal triad, and, second, seizures classed as grand mal or psychomotor.

RESULT OF THERAPY	PETIT MAL TRIAD PER CENT	GRAND MAL OR PSYCHOMOTOR PER CENT
Seizure free	33	6
Free of more than 75 per cent	30	6
Somewhat improved	21	8
Unchanged	13	35
Worse	3	45
Total patients	145	67

Therapeutic results in these two groups were opposite. Eighty-four per cent of patients with petit mal were improved; 80 per cent of those with convulsive or psychic seizes were unimproved. Just as the use of diphenylhydantoin may increase the frequency of petit mal, tridione may augment grand mal seizures when they occur frequently in patients having petit mal.

These observations do not mean that tridione cannot be used in patients having a combination of petit mal and convulsions. In the presence of frequent grand mal, the medication which has proved most effective in controlling these must be continued. An initial increase in grand mal when tridione is first given may not continue. If it does, tridione must be stopped, since petit mal seizures, in comparison with grand mal, are relatively innocuous.

As for control of the perplexing psychomotor seizures, tridione used alone seems of little effect. De Jong[7] reported relief of psychomotor seizures in six patients when tridione was added to dilantin or phenobarbital therapy. Occasionally I have encountered good results from combined therapy, but as yet the incidence of remissions is hardly beyond that which may occur spontaneously.

The long-term effects of therapy are of course unknown. some patients with brain pathology or with especially bad or persistent cerebral dysrhythmia, after a period of improvement, may experience a gradual return of seizures which may or may not be countered by an increase of dosage. Patients whose seizures and dysrhythmia are relieved usually display improvement in disposition and in mental alertness. Also, several who were rendered seizure free have discontinued therapy without, as yet, a return of symptoms. In judging the ultimate prognosis, and the safety of discontinuing medication, repeated electroencephalograms are of value.

Other conditions which cause trouble or even force temporary discontinuance of tridione therapy are widespread rash, increased irritability or overactivity, gastric symptoms, and photophobia. Photophobia is countered by the use of dark glasses: On the appearance of a rash, medication must be stopped until the rash clears, then resumed with small and gradually increasing doses. A plastic agranulocytic anemia with death occurred in one patient. A capsule of tridione contains 0.3 Gm. Conservative daily dosage is as follows: infants, 1 capsule; children 2 to 4 years of age, 2 capsules; 5 years and above, 3 capsules. Amounts may be increased to a maximum of three times those named.

These three drugs, dilantin, mesantoin, and tridione increase the range and effectiveness of therapy far beyond what we dreamed of ten years ago. But modern weapons of war are no better than pitch forks in the hands of the untrained and the uninterested. New medicines call for careful reading of the literature and conscientious trial by the practicing physician.

OTHER AND FUTURE TREATMENTS

The list of drugs and of measures which in the last few years have been reported as anticonvulsant, is impressive in length, if not in demonstrated value. Examples are: mebaral, delvinal sodium, di propyl oxazolidine dione, glutamic acid, thiamine, amphetamine sulfate, caffeine, atropin, acetycholine, azosulfamide, neoprontosil, brilliant vital red, desoxycorticosterone, dehydration, and even induction of convulsions by injections of a convulsant drug or by electric shock. Back of these drugs which have been given at least tentative clinical trial lies a backlog of dozens of chemicals which have proved of anticonvulsant value in animals but await evaluation in man.[8]

Even though these or other drugs do not promise immediate help for any substantial portion of the epileptic population, any treatments which are even partially effective, may, like bent twigs in a forest, point the path to the physicochemical mechanism of seizures.

We know what it is that we need yet to know—the abnormal metabolism of the neurones of the brain which causes them to discharge excessively or the abnormal rate regulating mechanism which results in synchronous or dysrhythmic discharges. Certain possible stepping stones to needed knowledge are visible. The respiratory quotient of the human brain is unity, of the many sugars, it burns only glucose, and in the approximate theoretical amount, 1.34 mg. per c.c. of oxygen. The chief products of glucose oxidation, carbon dioxide, is, together with pH, the chief stabilizer of the electrical potentials of the brain. When brain potentials are stable, the brain functions better and, if epileptic, it gives off fewer seizure discharges.

These data[9, 10] derived for the most part from a study of conscious healthy young men, whose electroencephalograms are normal, offer controls for observations of the metabolism of the brains of epileptics, and the influence on its metabolic processes of sugar, of oxygen, and of calcium, of fever, and of synthetic drugs which are known to influence seizures or cortical potentials. We require more knowledge of the inward workings of the nerve impulse, and the relation of seizures to the chemical mediation of nerve impulses across synaptic barriers. We must learn the role of endocrine glands, the balance in the nervous

system of potassium and sodium and the effect of vitamins and of penicillin (the last a convulsant when applied directly to the brain).

The problems of epilepsy are many—but surely not insoluble. If so much has been learned with so meager an expenditure of brains and money, what could be accomplished by a serious, concerted attack? In the study of child health which your academy is undertaking, the epileptic children should be moved out of their present obscurity into the front row, into a position of attention commensurate with their numbers and the devastating nature of their symptoms.

As to the most pressing immediate needs, I repeat the recommendations made before the Congressional Committee investigating possible governmental aids for the physically handicapped.[11]

1. $250,000 a year as grants in aid for research.
2. Establishment of a diagnostic-research-training center or centers.
3. Schools with proper medical supervision for the education and training of young patients of normal intelligence.
4. Education of the public to modern conceptions of epilepsy.

The proposed new Children's Center of Boston is planned to meet its responsibility as regards the second item on this list by the creation of a diagnostic-research-training center which will fill the triple purposes of a consultative service for hard-pressed pediatricians, research into some of the many unexplored problems of epilepsy, and a center of teaching and training for medical students, doctors, nurses, and social workers.

Treatment is more than judicious prescription of pills and capsules, or the skillful use of a scalpel. It means new discoveries. It means prevention. Treatment deals with fear and shame, with education and employment, with the instruction of patients and parents, professional staffs, and the world at large. Earlier I mentioned the fact that less than 2 per cent of articles on convulsions and epilepsy appear in pediatric journals. You, of course, agree that this is too small a share for physicians who are constantly confronted with convulsions, either single or recurrent. No pediatric problem is more intriguing or, when solved, more rewarding.

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IMMUNIZATION AGAINST WHOOPING COUGH

A Clinical Study

D. Lapointe, M.D.*
Quebec, Canada

CANADIAN statistics show that in 1944, scarlet fever was responsible for 115 deaths; poliomyelitis, 119; measles, 239; diphtheria, 309; and whooping cough, 336. During the same period in the United States, whooping cough has caused the death of more infants in the first two years of life than measles, diphtheria, poliomyelitis, and scarlet fever combined. On the basis of statistical evidence, however, it is difficult to appreciate the lasting and debilitating effects —postpertussis bronchiectasis, cerebral lesions—which so frequently follow an attack of pertussis. The high mortality rate, as well as the high incidence of sequelae which have been observed, would therefore appear to indicate that whooping cough is a disease against which therapeutic and prophylactic measures have either been ineffective or poorly understood.

At the present time, the treatment of whooping cough is being directed essentially toward the use of either rabbit or human serum, both of which have produced favorable results. In the realm of prophylaxis, it has long been admitted that isolation in the absence of other preventive measures is neither effective nor practical. At the time when the child is most highly infective, that is, in the catarrhal stage, it is often impossible to diagnose the disease clinically. While the cough plate method may provide a valuable diagnostic aid, it is not always reliable nor are bacteriologic laboratories always at the disposal of the attending physician. Active immunization would therefore seem to provide the only practical means of prevention.

In the early years following the discovery of *Hemophilus pertussis* by Bordet and Gengou (1906), an attempt was made to immunize children with a vaccine made from these organisms. In 1914, this vaccine was accepted by the Council on Pharmacy and Chemistry of the American Medical Association. During the following years, so many unfavorable reports appeared in the literature that the Council declared in 1931, that pertussis vaccines were no longer acceptable. In the same year, however, it was observed that the antigenicity of a bacterial vaccine was very high when such a vaccine was prepared from freshly isolated strains of *H. pertussis*.

Reports published in the last ten years have tended, for the greater part, to demonstrate the effectiveness of this newer vaccine. Among the authors who have contributed extensively to the study of this vaccine are: Madsen, in the Faroe Islands, Sauer, Kendrick, and Eldering.

A critical analysis of various publications on pertussis immunization would seem to point out that the measure of protection which is provided by bacterial vaccines ranges from 60 to 90 per cent. This variation has often been accounted

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*Professor of Clinical Pediatrics, Laval University.

for on the basis of such variables as the numerical count of organisms in the vaccine, the dosage and interval between doses, the number of injections, the possibility of an outbreak of parapertussis, and the particular resistance of certain individuals to *H. pertussis.*

Failure to provide protection in certain individuals led some investigators to believe that the toxin of the organism (which was first described in 1909, by Bordet and Gengou and later demonstrated by Teissier, Lawson, Evans, and Kimball) might be concerned with the etiology of the disease. In 1940, an endotoxin was isolated by Strean who, in collaboration with Grant, succeeded in demonstrating that the material was antigenic in rabbits. A quantity of rabbit serum, even as much as 0.016 c.c. was sufficient to protect a mouse against 2 M.L.D. of toxin. In later studies on the antigenic quality of this endotoxin, Strean produced a vaccine which contained 15 billion organisms per cubic centimeter combined with 150 provisional units of pertussis endotoxoid. This combined vaccine* has been under clinical trial at La Creche St. Vincent de Paul since 1942. We have observed the same local and general reactions which we ordinarily find when using the bacterial type of Sauer.

La Creche is a foundling home which houses 650 children whose ages range from birth to 4 years. The children are kept in dormitories measuring 36 by 14 feet in groups of 36. The dressing rooms and playrooms are common quarters so that the children come in close contact one or more times daily. Owing to crowded facilities, isolation is impossible in the event of contagious diseases.

Since 1942, 150 children have been vaccinated against whooping cough every year. All received three injections of 2 c.c. at one-month intervals. Because some of the children were adopted and some died before adoption, there remained only 100 vaccinated individuals in a total enrollment of 650 at the onset of an outbreak of whooping cough on July 1, 1945. At this time, the vaccinated individuals as well as the nonvaccinated children were together in the same dormitories. From then on, the immunized children were closely watched with regard to onset, frequency, severity as well as duration of paroxysms (Table I).

TABLE I. CONSOLIDATED REPORT ON OUTBREAK AT LA CRECHE

	NUMBER OF CHILDREN	PER CENT
Enrollment July 1, 1945	650	
Group previously immunized	100	
Group with a history of pertussis	35	
Controls	515	
Incidence of pertussis in nonvaccinated group	450	87.3
Incidence of pertussis in vaccinated group	10	10.0
Complications in nonvaccinated group		
Bronchopneumonia	6	
Deaths from bronchopneumonia	3	
Mediastinal emphysema	2	
Deaths from mediastinal emphysema	2	
Complications in vaccinated group	0	
Deaths in vaccinated group	0	

*Provided through the courtesy of Ayerst, McKenna & Harrison Limited.

Dormitory No. 319.—On Sept. 6, 1945, it was observed that cases of whooping cough were scattered throughout the dormitory so that contact appeared to be unavoidable. Under existing circumstances, we felt justified in instituting such measures as would indicate when an immunized individual came into contact with a pertussis case in order to test the degree of the immunity in the vaccinated group. To this effect, in this dormitory where there were eleven immunized children, we introduced between September 6, and November 7 (72 days) three children who had contracted the disease at the beginning of the outbreak and presented classical symptoms.

1. B. M. entered September 6, and removed October 18.
2. C. N. entered September 18, and removed November 17.
3. A. M. entered October 9, and removed November 17.

None of the immunized children developed symptoms of pertussis following 72 days of observation. It was not until December 29, or 42 days after the end of the observation period in Dormitory No. 319, that 2 children, P. L. and O. L., became ill with pertussis (Table II). R. L., another member of the group of eleven vaccinated children, began to whoop on Jan. 8, 1945, or 52 days after the period of observation had been completed. In these three children, the attack of the disease was severe in one, moderate in a second, and mild in a third. The remaining eight children resisted the disease.

TABLE II. HISTORY OF IMMUNIZED CHILDREN DEVELOPING PERTUSSIS

SUBJECTS	AGE (MONTHS)	ONSET OF DISEASE AFTER LAST INJECTION (MONTHS)	DURATION OF DISEASE (DAYS)	TOTAL NUMBER PAROXYSMS	VOMITING	CYANOSIS	SEVERITY OF DISEASE
V. V.	29	4	20	18	5	2	Mild
L. R.	32	4	33	28	6	14	Moderate
M. S.	31	8	19	100	6	0	Moderate
G. P.	34	6	22	112	2	0	Moderate
L. R.	32	6	27	98	2	0	Moderate
P. L.	16	5	32	150	8	18	Severe
O. L.	15	5	30	122	0	10	Mild
R. L.	15	6	24	110	13	12	Moderate
G. G.	19	6	21	60	3	0	Mild
M. B.	24	10	15	57	0	7	Mild

On Jan. 3, 1946, of the group of 100 previously immunized children, 21 who had not had the disease were given a fourth injection of 2 c.c. After two months' observation, none had contracted the disease.

COMMENTS

We want to emphasize the fact that in our clinical experiments, in view of the large number of children, the immunized individuals were exposed to pertussis for a longer period of time than is possible in a family and to much more massive infection. The children were literally submerged by the infection. In spite of these unfavorable conditions, not more than 10 per cent of the immunized children contracted pertussis and none with complications. The attack was

mild in four, moderate in five, and severe in one. It was difficult to determine to what extent immunization modified the disease. It is important to note, however, that in the nonimmunized group there were six cases of severe bronchopneumonia with death in three cases; two deaths resulted from mediastinal emphysema. Moreover, the group of immunized children who did not develop pertussis resisted massive infection for approximately 110 to 120 days. As a matter of fact, in Dormitory No. 319, where contact was rigorously controlled and where the eleven immunized children were exposed to massive infection for weeks, it took at least 114 days for the disease to develop in three children while the remaining eight were completely protected. This observation would appear to indicate that all individuals are not protected to the same degree by active immunization against pertussis. After verifying this observation clinically we decided to give a fourth injection to 21 previously immunized children who had not developed pertussis.

Considering the unfavorable conditions which rendered the children subject to certain exposure, we believe that the results obtained with the use of the combined bacterial vaccine and endotoxoid were excellent. We could not prove conclusively, however, that the endotoxoid increased the immune response because we did not have a control group immunized with bacterial vaccine alone. At the moment, it must remain an open question, but we expect to have the answer in the future since we anticipate experimenting with the two types.

While we believe that definite immunity is conferred by the injection of 6 c.c. of endotoxoid-vaccine, there seems to be no doubt that a booster dose of 1 c.c. given annually or every second year would give almost complete protection, thereby reducing materially the mortality and morbidity rates.

SUMMARY

Of 650 children at La Creche St. Vincent de Paul, 100 were immunized with pertussis endotoxoid-vaccine. In an outbreak of pertussis in this institution only ten of the immunized children developed pertussis and none developed complications or died.

In the controls, 450 became ill with the disease, six developed bronchopneumonia of which three died, and two died of mediastinal emphysema.

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IDIOPATHIC LIPEMIA

BERTHA M. LEVY, M.D.
OKLAHOMA CITY, OKLA.

THERE have been reported in the literature only six cases of idiopathic lipemia. Bürger, and Grütz[2] reported the first two cases in 1932; Goodman, Shuman, and Goodman[3] and Chapman and Kurney reported a case and included a post-mortem examination; Franklin; Opitz;[4] and Holt, Aylward, and Timbres[1] also reported cases, the latter being very completely worked out. All the cases had in common, lipemia and hepatosplenomegaly. In four cases it was stated that improvement occurred on a low-fat diet.

This purpose of this paper is to present another case of this unusual disease.

H. H., an 8½-year-old child, was first seen in May, 1944, with the history of having had nausea and vomiting intermittently throughout the previous winter. For the past month he had had abdominal pain, but the nausea and vomiting had ceased. The pain, which was almost constant, began around the umbilicus and radiated to the right flank and the right lower quadrant. Pain was increased on the ingestion of food but not on drinking water. The patient was thought to have had fever the night before he was seen.

There was a history of hard stools since infancy. For this he had taken Agarol. Past illnesses included purulent otitis media, pertussis, rubeola, and varicella.

At examination the child weighed 51 pounds and was alert and active. Dental caries was present. The remainder of the examination was normal except the abdomen, where there was considerable tenderness with moderate muscle spasm on the right, especially the right upper quadrant. The liver was enlarged about 2½ inches below the costal margin and extended to the left of the midline. The spleen was palpated to just above the level of the umbilicus. Blood count at that time was 14,200 white cells, neutrophiles, 78 (filamented 57, nonfilamented 21); lymphocytes, 16; and monocytes, 6. When he was seen again two days later in consultation with a surgeon, the examination was unchanged except that the abdomen was no longer tender. As he had felt well during those days it was decided to temporize, and Syntropan was prescribed for pain.

Two weeks later he was seen again. He had had no pain until the morning of the examination. Syntropan was given then without effect. Abdominal examination was unchanged. Blood count was rechecked and revealed 10,800 white cells; neutrophiles, 73 (filamented 53, nonfilamented 20); lymphocytes, 23; eosinophiles, 2; and monocytes, 2. The technician at that time remarked that the blood was very peculiar and that she had made the count three times. Venous blood was withdrawn and looked like melted strawberry ice cream. When it was allowed to clot, the serum was milky. On refrigeration of the supernatant fluid, approximately one-half the fluid was fat and one half serum. Blood studies and other studies done before and during hospitalization are recorded herein.

The patient was placed on a fat-free diet and got along very well except for one time when he ate fried chicken and ice cream. This precipitated an attack of severe pain following which he vomited and had a few loose stools. Over a period of several months there was a decrease in the size of the liver and of the spleen. Then he began to resume a full diet. He felt well, but his liver and spleen enlarged somewhat. Ophthalmoscopic studies showed lipemia retinalis.

Because of technical difficulties it was impossible to do serum fat determinations or to send specimens elsewhere for laboratory examination. The amount of fat was roughly estimated by the relation to the total fluid after removal of the clot and refrigeration of the fatty serum.

On the first and subsequent examinations until a low-fat diet was instituted, the lipoids were about one-half. When the diet was adhered to they dropped to one-fifth. When the patient resumed a full diet they became approximately one-third.

Plasma cholesterols on several occasions varied from 250 to 329 mg. per cent. The values were the same before and after fat extraction with ether. Fasting blood sugars were repeatedly normal. Exton's glucose tolerance gave a rise from 73 mg. glucose, fasting, to 98 mg. in thirty minutes and 105 mg. in one hour. There was no glycosuria. Stool examination showed occasional neutral fat globules and no fatty acids or soaps. Widal test was negative; gastric analysis, normal; bone marrow smears, normal; skull film, G-I series, and excretory urograms were normal.

Blood taken from the mother, father, and a half-brother (mother's child) appeared normal. The sister of the patient had about one-fourth fat. She has never had any complaints. Abdominal examination was unsatisfactory.

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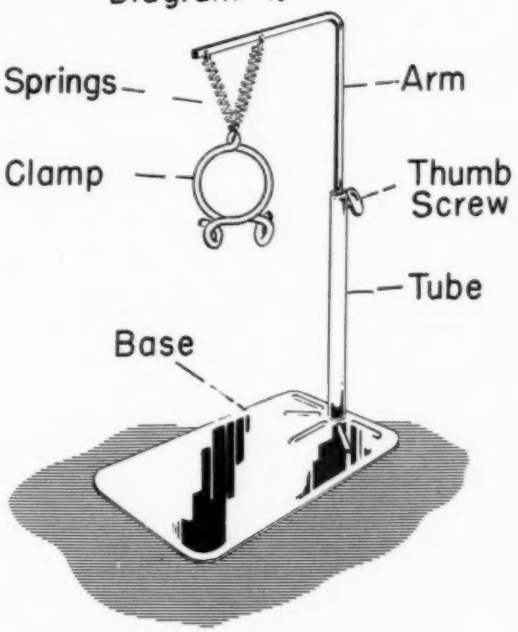
A PRACTICAL DEVICE TO HOLD THE NURSING BOTTLE DURING BOTTLE FEEDING

H. WRIGHT SEIGER, M.D.
SANTA MONICA, CALIF.

ALTHOUGH much progress has been made on the problem of the type and cleaning of nipples and bottles, little practical progress has been made in improving the position of the bottle and nipple during bottle feeding.

Hoffman[1] noted that during the sucking motion in breast feeding, the mandible was lowered and pushed forward and the muscles of the tongue, cheeks, lips, and pharynx were called upon for a combined and vigorous action. Through the muscular pull a healthy stimulation is exerted on the bones of the jaw, mouth, and nose.

Diagram I.



Saxl[2] states that when a proper nipple is placed in the child's mouth, its base should press against the maxilla causing the less-well developed mandible to be thrust forward into the correct position before the mouth is closed for sucking.

However, whether the child is on the attendant's lap, or lying on his back in bed with the bottle being held by hand, the attendant's hand usually soon tires and the bottle sags to the child's chest. The weight of the bottle tends to press against the mandible instead of the maxilla thus hindering the for-

ward movement of the mandible. Also, if the bottle is dropped to a horizontal position the child will suck quantities of air.

Grulee[3] deplores the fact that in many hospitals, due to shortage of attendants, it is a custom to elevate the bottle on a pillow and allow the child to get the food in the best way he can. This method is also used in many homes where the mother is too busy to hold the bottle. In this position the insufficient inclination of the bottle allows the child to swallow a lot of air after the level of the liquid is below the orifice of the nipple. Another disadvantage of this

Fig. 1.

method is that the child is in a horizontal position which hinders the eructation of swallowed air, whereas the semiupright position would facilitate the escape of swallowed air during feeding. Moreover, feeding the child on his left side or right side adds gravitational effects to the passage of swallowed air and food into the stomach which has certain disadvantages that the upright or semiupright positions tend to avoid.

Since sufficient attendants in the present-day hospitals are a rarity on account of expense and other factors, and labor-saving devices, sometimes

superior to manual procedures, are one of the advantages of the so-called American way of life, a satisfactory device to hold the nursing bottle in a proper position seems desirable for both attendant and child.

Hence the description of a device that has been in service here for more than five years and has proved satisfactory in use. It is sufficiently simple for the average attendant to accustom herself to, yet it is adaptable to almost any type of feeding location in the home and in the hospital.

Fig. 1 is a pictorial representation of the device and Fig. 2 shows the device in use.

Specifications are: The base should be 6 by 9¾ inches of 16 gauge sheet steel. To the base is welded a tube ¼ inch inside diameter and 9½ inches high, and at its upper end is welded a 10 by 32 nut to take a thumb screw. The part of the tube above the thumb screw is flattened to make a half-round opening. The arm is of 3/16 inch square steel rod. This prevents the arm from rotating when placed in the half-round opening of the tube. The horizontal part of the arm is 7 inches long and the vertical part 9¾ inches. Attached to the arm are two small coil springs 2¼ inches apart; and below, the coil springs are connected to the clamp. The clamp is of piano wire .100 inches thick and is covered with blood pipette rubber tubing.

A pillow and /or folded blanket should be placed under the shoulders and head of the child and over the base of the device to incline the body up to about a twenty-five-degree angle.

With the child in position as in Fig. 2, the nipple of the filled bottle is placed in the child's mouth and the clamp is opened slightly by pressing the pressure pads together. Slide the clamp over closed end of the bottle about one-third the distance from closed end of the bottle. Release pressure pads and clamp will grip the bottle automatically. The height of the arm is raised until there is the slightest tension in the coiled springs, then tighten thumb screw.

If a child is fed in the same place at each feeding it is seldom necessary to adjust the thumb screw after the first feeding. The clamp alone will compensate for slight variations of position. For the child old enough to sit in a high chair the device will hold the nursing bottle satisfactorily if that feeding location is desired.

The child may let go of the nipple when he tires of nursing and after a rest period it should be replaced. The average child of 4 months or older will reach up and replace the nipple dangling over his head into his mouth by himself when ready to resume nursing.

The child should be held over the shoulder or allowed to sit erect after the feeding in order to belch as is done after a breast feeding but it will be found that much less eructation is necessary than if the child were fed horizontally.

REFERENCES

1. Hoffman, K. F.: Deutsch. Zahnärztl. Wchnschr. 1933. (Quoted by Saxl.)
2. Saxl, N. T.: Pediatric Dietetics, Philadelphia, 1937, Lea & Febiger.
3. Grulee, C. G.: Infant Feeding, ed. 4, Philadelphia, 1922, W. B. Saunders Company.

American Academy of Pediatrics

Proceedings

REPORT OF THE MEETING OF THE EXECUTIVE BOARD OF THE AMERICAN ACADEMY OF PEDIATRICS

CHICAGO, ILL., JUNE 7, 8, 1946

A meeting of the Executive Board was held at the Palmer House, Chicago, on Friday and Saturday, June 7 and 8, 1946. The first session was called to order at 10 A.M., Friday by the President, Dr. Jay I. Durand. There were present: Drs. J. I. Durand, Lee Forrest Hill, Edgar E. Martmer, Marshall C. Pease, Paul W. Beaven, Hugh K. Berkley, James W. Bruce, Roger L. J. Kennedy, Félix Hurtado, George F. Munns, Warren W. Quillian, Vernon W. Spickard, Oliver L. Stringfield, and Clifford G. Grulee.

The following applicants were elected to Fellowship:

Region I

Harry Bloch, Brooklyn, N. Y.
Amy Breyer, Hartford, Conn.
John K. Brines, Wellesley, Mass.
John W. Buckley, Bridgeport, Conn.
Philip S. Chasin, Forest Hills, L. I., N. Y.
Charles Henry Classen, Rosemont, Pa.
Harry E. Cohen, New York, N. Y.
Robert Downing Cox, Worcester, Mass.
Howard Reid Craig, New York, N. Y.
Joan Neilson Daly, Forest Hills, L. I., N. Y.
Charles H. Deichman, Morristown, N. J.
Francis C. DeLorenzo, Newark, N. J.
Lester Jacob Greenberg, Far Rockaway, N. Y.
John E. Gundy, Rye, N. Y.
Arthur P. Keller, Ellwood City, Pa.
Anthony J. Maffia, New York, N. Y.
James H. Maroney, Summit, N. J.
Frank Louis Marting, Schenectady, N. Y.
Charles D. May, Boston, Mass.
Charles A. Murphy, Stamford, Conn.
Hugo Neuhaus, Freeport, L. I., N. Y.
Gertrud C. Reyersbach, Boston, Mass.
Irwin Schiff, Brooklyn, N. Y.
Lawrence M. Shapiro, New York, N. Y.
Dorothy L. Shindel, Philadelphia, Pa.
Harry Shwachman, Roxbury, Mass.
Joseph Frankle Siegel, Washington, Pa.
Sydney E. Sinclair, Williamsport, Pa.
Lois Miller Smedley, Forest Hills, L. I., N. Y.
W. Russell Smith, New York, N. Y.

Samuel Stone, New York, N. Y.
Elizabeth Ufford, Port Washington, N. Y.
Helen M. Wallace, New York, N. Y.
Mortimer Wolf Weber, New York, N. Y.
Gibson J. Wells, Baltimore, Md.
Jean Wells, West Hartford, Conn.
Gladys Winter, Teaneck, N. J.
Murray Woronoff, Keyport, N. J.

Region II

Katherine Anderson, Winston-Salem, N. C.
William R. Britton, Montgomery, Ala.
Harold W. Buchner, Oklahoma City, Okla.
Jacob A. Danciger, Memphis, Tenn.
James P. Hanner, Atlanta, Ga.
James Harrell Harris, Marshall, Texas
Paul Hogg, Newport News, Va.
Weston M. Kelsey, Winston-Salem, N. C.
Selby V. Love, Louisville, Ky.
Philip Magrish, San Antonio, Texas
Joseph H. Patterson, Gastonia, N. C.
J. Cyril Peterson, Nashville, Tenn.
David William Van Gelder, Baton Rouge, La.
Robert B. Warfield, Lexington, Ky.

Region III

Edward W. Beasley, Chicago, Ill.
Meryl Myron Fenton, Detroit, Mich.
Herbert William Fink, Detroit, Mich.
Harold F. Flanagan, St. Paul, Minn.
Morton J. Freedman, Peoria, Ill.
Lawrence Eddy Goldman, Clayton, Mo.
Werner K. Gottstein, Chicago, Ill.
George Martin Guest, Cincinnati, Ohio
Evelyn Smith Harris, St. Paul, Minn.
Stanley L. Harrison, St. Louis, Mo.
Louis Edward Heideman, Detroit, Mich.
Kenneth E. Humphrey, Alton, Ill.
William Wayne Lockwood, Urbana, Ill.
William G. Motel, Chicago, Ill.
Joseph N. Rappaport, Evanston, Ill.
Eleanor J. Rector, Akron, Ohio
Henry F. Saunders, Cleveland, Ohio
Lloyd Marlow Simonson, Sheboygan, Wis.
Matthew Michael Steiner, Chicago, Ill.
Walter Stoeffler, Indianapolis, Ind.
Robert H. Trimby, Lansing, Mich.
James R. Wilson, Chicago, Ill.

Region IV

Robert H. Alway, Salt Lake City, Utah
John A. Anderson, Salt Lake City, Utah
Virginia Murray Cobb, Carmel, Calif.
Paul T. Hahman, San Francisco, Calif.

Clement J. Molony, Beverly Hills, Calif.
Sidney Rosin, Los Angeles, Calif.
Robert A. Trombley, Albuquerque, N. M.

Dr. Frank L. Fletcher of Ann Arbor, Michigan, was reinstated at his request.
The resignation of Dr. Newton T. Saxl of New York was accepted.
Upon application, Dr. L. R. DeBuys was granted Emeritus Membership.

Report of the President

It is customary for the president to give a brief report of the activities of the Academy since the last meeting.

The most notable achievement has been the financing of the Child Health Study and the energetic manner in which the project is getting under way.

The Executive Board and the members of the Academy are very grateful to the National Foundation for Infantile Paralysis, Inc., Mead Johnson and Company, M and R Dietetic Laboratories, Inc., Carnation Company, Pet Milk Company, the Field Foundation, and the Lederle Laboratories, Inc., for providing funds which enable us to meet the rather staggering budget with which we were presented at the Detroit meeting.

Dr. Sisson and his committee and the very efficient director, Dr. John P. Hubbard, now have the work well under way in all but a few states. The pilot study in North Carolina is daily proving its value in furnishing local committees and state chairmen with valuable techniques and methods of procedures. The scope of the study is being enlarged to cover pediatric education. After the survey is completed, the Academy should be the agency to carry on child health work wherever its need has been demonstrated. I would suggest that a Post-Survey Planning Committee be named at our next meeting.

One of the pleasant experiences of the early months of my administration has been the willingness of almost all whom I have asked to serve on committees and as state chairmen. The state chairmen particularly have undertaken the job knowing that it involved much work of a kind not congenial to many of them.

The plans for an Academy sponsored Pan-American meeting have been upset by the decision to hold an International Pediatric meeting in 1947. Had the members of the Executive Board been informed that plans for this meeting were under way, this confusion could have been avoided. The Board must decide how to unscramble this situation.

The Secretary and the Academy Office are doing a very worth-while job in placing physicians released from service in residencies and equivalent positions. The survey made by Dr. McQuarrie's committee has been helpful. There are many more candidates than positions offered. I believe that there are more hospitals which could offer such residencies with benefit to themselves and the men seeking instruction.

Report of the Secretary

Perhaps the matter which most of us have at heart at the present time is the question of the legislation in Washington. It is only by insistence that Dr. Wall was able to appear before the Committee, as you will see by his subsequent report. We, of course, have no information as to what may happen, but we have done what we could to prevent what most of us feel would be a calamity to the children of the United States.

As recommended by the Secretary and voted by the Executive Board at the last meeting, it was decided to do away with memberships in Latin America which required only $5.00 a year dues. There were forty-six of these members who were on the $5.00 list. All but one of these from whom we have heard has decided to continue on the revised $10.00 list so that it seems now that only a small proportion of the members in Latin America will fail to avail themselves of the change. This has materially altered the situation with respect to the Latin-American members in that it has done away with one of the most costly efforts by discontinuing the Spanish abstracts. As you will see in the budget which is being presented,

the question of Latin-American membership has been deleted and this has been absorbed in the general budget since the cost for Latin-American members is not great as a result of this change.

There has also been a change with respect to the Latin-American Scholarships as the result of the paucity of residencies and training possibilities of men coming out of our own Armed Services. It has been necessary to discontinue the Latin-American Scholarships for a period of two years. As you will see, now there are only four in this country. We hope we will be able to reinstate this program, perhaps on a broader basis, when the situation clears. We are receiving requests, as are all institutions that are giving scholarships, from men from other countries, China and Spain among them. I might say that I was in Washington at the State Department meeting where I found out a number of things regarding scholarships. One of the things I was most pleased about was that probably our scholarship situation is the best of the whole bunch. The difficulties regarding scholarships are practically two; the principal one by all odds is the language difficulty. These men do not come to this country prepared to speak American. They may know idiomatic English, but when it comes to talking to patients in an outpatient department and getting a history, they are not prepared to do it. In many instances, the basic education of these men has not been up to par. Their basic education, especially in biochemistry, is not what we usually expect from our men. As a matter of fact, nearly all the men have been at least satisfactory and many of them have been outstanding, although they come from places which are especially well suited. I will come to that later.

Courses in pediatrics with which, as you know, the secretary has been concerned for the past six months have been a continual source of worry in that there are so many more applicants than positions. This matter will be brought out in a report to the Executive Board.

As you all know, much to the surprise and gratification of all of us, the amount of money asked for by the Committee on Study of Child Health Services was raised by the middle of April and that survey is going along nicely. So far as the secretary knows, there has been good cooperation by all the state chairmen and the situation bids fair to get results in the not too distant future. There are two states, namely Utah and Oklahoma, without state chairmen at the present time and until these situations are remedied, of course no surveys can be made in these states. However, I do not anticipate too much difficulty along these lines. The secretary was in Washington in April at which time he had the pleasure of visiting the headquarters for this survey. They seem ample and the staff seems to be enthusiastic and cognizant of the importance of this survey to the children of this country.

On April 13, the Secretary made a trip to Pittsburgh to the Hotel William Penn where he met Dr. Edgar E. Martmer. The setup at the Hotel William Penn is as good as any we have ever had, and we should have excellent cooperation there. The local committee is cooperating in every way, and there should be a large attendance at the meeting November 13-16. We had a very satisfactory conference with Mr. Frey of the Convention Bureau of that city who volunteered to take care of hotel reservations.

Conferences on the International Congress of Pediatrics with Dr. Helmholz and Dr. Holt proved unsatisfactory.

It is my unfortunate duty to report to you at this time the deaths of:

Dr. G. E. Harrison, Mason City, Iowa
Dr. Joseph C. G. Regan, Brooklyn, N. Y.
Dr. Chester A. Stewart, New Orleans, La.
Dr. J. Herbert Young, Newton, Mass. (Emeritus Fellow).

Respectfully submitted,

CLIFFORD G. GRULEE, Secretary

Report of Region I

Your Regional Committee wishes to express its thanks to all the state chairmen and other fellows of the Region for their hearty cooperation in carrying out the activities of the Academy.

Since the last report the usual Academy activities have been proceeding satisfactorily in spite of the heavy load placed upon the shoulders of the state chairmen due to the Study of Child Health Services.

Dr. John P. Hubbard will present the details of the Study of Child Health Services in this region. It is gratifying to report that as of May 24 our region has a 100 per cent record for the appointment of executive secretaries to attend to the details of the Study.

Under the able leadership of Dr. Miner C. Hill, Local General Chairman, Region I held a meeting at the Pennsylvania Hotel, April 2, 3, 4. This meeting was without question the most outstanding meeting ever held in the Region. There was a registration of 884, exclusive of exhibitors. Of this number 450 Fellows were representing better than 50 per cent of our regional membership.

As for the meeting itself: The program of superlative quality was its highlight. This was prepared by our local committee consisting of Drs. Rustin McIntosh, chairman, Philip M. Stimson, cochairman, Harry Bakwin, Murray H. Bass, Adolph G. DeSanctis, L. Emmett Holt, Jr., Samuel Z. Levine, and Charles A. Weymuller.

The chairmen of the other committees were: Finance and Exhibits, Dr. Alfred E. Fisher; Publicity, Dr. Carl H. Smith; Arrangements, Dr. Thurman B. Givan; Registration, Dr. Leslie O. Ashton.

The over-all success was due to the hard work and wholehearted cooperation of these men and their assistants. The finishing touch which made the meeting complete was the work of the Women's Committee. This committee, consisting of New York pediatricians' wives, served tea, obtained theater tickets, arranged for a fashion show and other activities for the entertainment of visiting pediatricians' wives. To this committee we give our thanks.

OLIVER L. STRINGFIELD, Chairman
PAUL W. BEAVEN, Cochairman

Report of Region II

Activity in Region II, since the last meeting of the Executive Board at Detroit in January, 1946, has been most encouraging. Much of the renewed interest in Academy affairs since World War II may be attributed to the fine objectives of the survey of Child Health Services. Pediatricians are becoming aroused to a realization of their individual responsibility and are anxious to help. The preliminary organizational work has been launched in every state of this Region, due to the excellent planning of Dr. John Hubbard the Executive Director, and his associates. More detailed information concerning progress may be obtained from Dr. Hubbard's report. It has been felt by the Regional Committee that compilation of data and direction of effort should come from the national headquarters at Bethesda; we can lend our aid in an advisory capacity in local problems which arise during the course of the survey.

Fourteen members have been elected to membership, and three names are being submitted as applicants at this meeting of the Executive Board.

A request has been received from Dr. Harvey Garrison (Mississippi) for a Regional Meeting this fall coincident with the Annual Meeting of the Southern Medical Association, and prior to the Annual Meeting of the Academy at Pittsburgh. An expression of opinion concerning this matter is desired from the Executive Board by the Regional Committee. Difficulties of planning a program upon short notice, limited clinical facilities at Miami, and the previously expressed policy of the Board against regional meetings near the date of the National Convention, present problems worthy of discussion.

State chairmen are, in most instances, participating very actively in the survey. No formal reports have been requested from them concerning their general Academy responsibilities on account of the current detailed demands of this work.

Respectfully Submitted,

WARREN W. QUILLIAN, Chairman Region II
JAMES W. BRUCE, Associate Chairman Region II

Report of Region III

Five new state chairmen have been appointed in Region III. They are:

Dr. Benjamin Hoyer, Ohio
Dr. Ernest Carlo, Indiana
Dr. Henry Poncher, Illinois
Dr. James E. Dyson, Iowa
Dr. Roland E. Nutting, Minnesota

Reports from the state chairmen of Region III indicate that most of their activities during this year have been concerned with the Child Health Survey. This work will be reported in detail by Dr. Hubbard.

Dr. Poncher reports from Illinois that the Academy is active in the State Rheumatic Fever program and in the Parent Teacher Association plans for summer round-up examinations is in contact with the Mayor's committee concerning preschool health programs in Chicago and is interested in establishing an extension of health services by setting up several downstate health centers in communities where such medical attention has not been available to mothers and children.

In several other states, child welfare work is going on in cooperation with the American Legion. Activity is also reported in school health problems and in infant health problems. In general, usual Academy activities in the region have been held somewhat in abeyance so that proper attention may be given to the Child Health Survey which is now under way in most of the states of the region. There was no report from five of the states.

The financial statement for the region remains unchanged since the January report. Total assets remain at $4,061.68, except for uncomputed accumulated interest since January, 1946, on deposits of $2,211.68.

In addition to these funds, the treasurer of the Academy holds bonds to the credit of Region III in the amount of $1,850.00 with a face value of $2,500.00.

Present enrollment in Region III is four hundred and eighty members. Twenty-two applicants will be voted on at the June meeting of the Executive Board.

Respectfully,
GEORGE F. MUNNS, Regional Chairman

Report of Region IV

The past year, from the pediatric point of view, has varied but little from the war years. The stress of work for those not privileged to be in the Armed Forces for the most part has prohibited all medical activities other than the daily grind of private practice.

Last year we expressed the hope that the return of many of the men from the Military Services would so ease matters that Academy activities might again be resumed. This hope has not been realized. Although many men have returned, they have been so occupied with such minor diversions as finding a place to live and finding office space, that they have furnished little relief and have had little time to spare over and above the time spent on these things. Last fall the membership expressed the desire to hold a regional meeting this spring and much effort was expended in trying to locate a satisfactory place for such a meeting, to no avail. At this time it does seem possible that the annual meetings may be resumed in the spring of 1947.

The Southwest Pediatric Society, most of whose members are also members of the Academy, expects to resume its three-day session and lecture course in September of this year.

Perhaps the most important news items from the west coast and Region IV are (1) the decision by the University of California to establish a new medical school in Los Angeles; funds for this project have been appropriated, and the next year should see it well under way and (2) entrance of the first class into the University of Washington Medical School in the fall of 1946.

Respectfully submitted,
HUGH K. BERKLEY, Chairman Region IV
VERNON W. SPICKARD, Associate Chairman Region IV

Report of Region V

The matter of most importance for consideration by this Executive Board concerning Region V is the one related to the decision in reference to the celebration of the First Pan-American Congress of Pediatrics and the definite possibilities of its coming through.

I have amply informed all the Latin-American groups of the decision reached by this Academy. In principle, which is to be expected, there is great satisfaction and interest in this Congress. But especially Drs. Garrahan of Buenos Aires, Krumdieck of Lima, and Gomez of Mexico, pointed out the previous agreement, which was reached in Chile, to celebrate a Latin-American Pediatric Reunion in the fall of 1948. They consider, therefore, that the reunion planned by the Academy may interfere with the one in Buenos Aires.

Since our decision, the organizing committee of the International Congress of Pediatrics insisted on celebrating their reunion in the fall of 1947, presenting various reasons in accordance with the colleagues of Europe and the representatives of the American Pediatric Society and the Society for Pediatric Research.

Accepting Dr. Helmholz' kind invitation, we have had the opportunity to exchange our points of view on this particular matter at Sky Top, Pa., discussing carefully the pros and cons as to these reunions and the possibilities of extending our cooperation to the same.

To that effect we have had an urgent consultation with the Latin-American centers, especially those of greatest pediatric activity, such as Argentine, Mexico, Chile, and Brazil; and the consensus of opinion is in favor of an intelligent coordination of the different pediatric events.

It is convenient to inform this Executive Board of some of the aspects of pediatrics in Latin America.

There are in Latin America many pediatric societies perfectly organized, whose contribution in the field of scientific research is quite outstanding.

Argentine has the "Society of Pediatrics of Buenos Aires, del Rosario and of Cordoba," with more than 200 members. Only 21 pediatricians belong to the American branch.

Chile has "La Sociedad Chilena de Pediatria" in Santiago and "Lo Sociedad de Pediatria de Valparaiso" with about 153 members. Only 13 belong to the branch of the American Academy.

Mexico has "La Sociedad Mexicana de Pediatria" with more than 100 members, 15 belonging to the American branch.

Brazil has "Las Sociedades de Pediatria de Rio de Janeiro y San Pablo" with more than 100 members, 25 belonging to the American Academy.

Colombia has 50 members, of which 7 belongs to the American Academy.

Peru has more than 60 members of which 7 belong to the American Academy.

Uruguay has "La Sociedad Uruguay de Pediatria" with more than 100 members, 28 belonging to the American Academy.

Cuba has more than 150 members of which 13 belong to the American Academy.

Thus we can see that the number of members belonging to organized societies of pediatrics reaches above 1,000 in Latin America, of which only 163 are members of the American Academy of Pediatrics, which represents only 16 per cent.

The International Congress is a permanent institution with periodical reunions of international official character and the invitations to attend these are transmitted through official channels through the Department of State.

When the different governments of Latin America receive the invitations through their respective legations and embassies they will proceed immediately to designate their corresponding delegates, it being our mission to see to it that these designations fall upon members of the American Academy of Pediatrics since these are the most influential and distinguished in each country.

Far from being a handicap, the celebration of the International Congress is a motive favorable to the reunion of the members of Region V, Latin-American Division.

Because of all this we feel that it is to the interest of Region V that the Academy offer its cooperation to the celebration of the International Congress, designating to this effect three of its members to become members of the Executive Committee of the International Congress, in conjunction with the members belonging to the American Pediatric Society, the Society for Pediatric Research, and the Pediatric Section of the American Medical Association which, together with the officials designated in Rome, should constitute the Grand Organizing Committee.

We believe that it is fitting that one of the three members of the American Academy should be the Chairman of Region V, in that he represents the incorporation of twenty countries.

The Latin-American pediatricians will present to the Committee of the International Congress their points of view, which refer principally to the motion of declaring Spanish as an official language and to the active participation of the Latin pediatricians as official participators in the Congress.

In conclusion, Region V presents to the Executive Board of this Academy, the following motions:

1. The Executive Board backs the celebration of the International Congress of Pediatrics to be held in the city of New York in the fall of 1947.

2. Authorize the President to designate three members of this Executive Board who will become members of the Executive Board of the International Congress.

3. Authorize the Chairman of Region V to convoke the members of this region three days previously to the International Congress at which time the meeting of Region V will be organized in order to develop the planned program by the Organizing Committee of the First Pan-American Congress of Pediatrics.

In the name of the Latin Pediatricians that constitute Region V, I beg the members of this Executive Committee to back this motion that tends to coordinate the different events planned, facilitating in this manner the celebration of the International Congress of Pediatrics in the fall of 1947, the celebration at the same time of the general meeting of Region V, and at such time permit us to extend our cooperation to the fullest success of the reunion in Buenos Aires in 1948.

Respectfully submitted,

FÉLIX HURTADO, Chairman, Region V

Report of the Treasurer

Dues for 1946-1947 were placed at $25.00 including $5.00 for subscription to the JOURNAL. The $5.00 dues for Region V were discussed and all members were put on a $10.00 a year basis.

It was voted that a charge of $2.00 be made for each round table at the annual meeting.

Report of the Treasurer

STATEMENT OF RECEIPTS AND DISBURSEMENTS, JULY 1, 1945, TO MAY 31, 1946

Balance in checking account, July 1, 1945	$ 344.33
Balance in savings account, State Bank & Trust Company	3,838.72
Balance in savings account, First National Bank & Trust Co.	1,544.61
	$ 5,727.66

Receipts:			
Dues		$28,323.61	
Wartime assessment		6,795.00	
Exhibits—January, 1946 Meeting		8,230.00	
Initiation fees		3,925.00	
Interest earned		944.62	
Pamphlets—Child Health Record	$ 399.31		
Immunization Procedures	424.55		
Vitamins	18.80	842.66	
Subscriptions—Men in Service		897.50	
Committee—Post-War Courses		10,000.00	
Bonds sold		10,000.00	69,958.39
			$75,686.05
Disbursements:			
Annual Meeting—January, 1946		3,984.97	
Annual Meeting—November, 1946		59.48	
Bank charge and exchange		129.23	
Certificates and mounting		74.03	
Executive Board		2,598.64	
Miscellaneous		297.57	
Office supplies and equipment		221.84	
Postage		565.57	
Rent		2,557.36	
Salaries—Secretary	$8,750.00		
Assistant Secretary	1,283.32		
Stenographer	2,390.00		
Office	1,428.71	13,852.03	
Stationery and printing		1,661.07	
Subscriptions		7,962.07	
Telephone and telegrams		480.36	
Travel-Secretary		434.08	
Treasurers' bonds		85.00	
Expense—Region I	$ 39.26		
Region III	5.50		
Region V	1,959.68	2,004.44	
Expense—States (Region I)	50.53		
(Region II)	30.26		
(Region III)	18.09	98.88	
Expense—Committees			
Cooperation With American Legion	395.21		
Legislation	25.00		
Post-War Courses	$1,345.33		
Post-War Planning	17,348.52		
Rheumatic Fever	100.00		
Special	22.05	19,236.11	
Pamphlets—Child Health Record	26.66		
Immunization Procedures	27.54		
Vitamins	7.8	54.98	56,357.71
			$19,328.34
Balance in checking account, May 31, 1946			$ 9,993.45
Balance in savings account, State Bank & Trust Company			7,782.56
Balance in savings account, First National Bank & Trust Co.			1,552.33
			$19,328.34

Reports of Committees

Report of the Committee for the Study of Child Health Services*

The executive Staff for the Study of Child Health Services has greatly increased in number since its early beginning. Dr. Montgomery Blair, Jr., was appointed as Assistant to the Director in February, 1946. Dr. John M. Mitchell has recently been added to the executive staff. Regional directors who have been appointed without necessarily adhering to existing regional divisions of the Academy are as follows: Dr. Lendon Snedeker for the New England States, Dr. Ward L. Chadwick for the Midwestern States between the Mississippi and the Rocky Mountains, and Dr. H. E. Thelander for the Far West. Including these Regional Directors the personnel of the Central Office totals twenty-two, of whom ten are on the payroll of the Academy, three on the payroll of the Children's Bureau and nine on the payroll of the United States Public Health Service.

In order to finance the Study, additional funds have been received. In accordance with action taken by the Executive Board of the Academy at the annual meeting in Detroit in January, 1946, $10,000 has been received from the reserve fund in addition to the $8,000 originally appropriated. Grants have been received or pledged on a two-year basis from the following Foundations which had previously been approached: National Foundation for Infantile Paralysis, Inc., $116,000, Field Foundation, $10,000. Since January, 1946, a total of $85,000 has been received or pledged from the following pharmaceutical houses: Mead Johnson and Company, Lederle Laboratories, Inc., M & R Dietetic Laboratories, Inc., Pet Milk Company, and Carnation Company. (Mead Johnson and Company had previously given $8,000).

In accordance with the budget originally submitted, these funds are to cover the salaries of the Executive Staff and the operating expenses of the Central Office. In addition to these funds, state programs are being financed from within their own borders with the support of funds available through county chapters of the National Foundation for Infantile Paralysis, State health departments, State foundations and pharmaceutical houses, contributions from medical and pediatric societies and from individual pediatricians. When State programs have been fully developed and financed from sources at State level, the responsibility of the Academy as expressed in the over-all budget will have been fulfilled.

The organization of state programs has progressed rapidly throughout the country. Obviously those state chairman who have been able to secure the services of full-time executive secretaries have been able to make the greatest advances. The rapidity with which state programs have been developed and the extent to which difficulties have been met by state chairmen and executive secretaries represents an outstanding achievement. As of June 1, 1946, executive secretaries have been appointed in 38 states. In these states the programs are well under way and the distribution and collection of schedules has begun. Approval of the Study by pediatric groups has been reported from 34 states. Endorsement of the project has been received from 37 state medical societies and 42 State departments of health. A total of 45 states and the District of Columbia are now in the process of organizing their programs. Up to June 1, only 3 states have failed to report active organization and approval of state study programs.

Plans are now being developed for tabulation of data. These plans are based largely on the experience obtained from the pilot study in North Carolina. A major phase deals with the question of classification of the material to bring out differences in the distribution of health and medical services for children. Tables and maps grouping hospital, physician, and dental services in several states, according to various characteristics of counties, were presented in April to some of the members of the Committee for the Study of Child Health Services and on May 24, 1946, to the Advisory Committee. The items considered for each county were: metropolitan character, size of largest city, and purchasing power. This approach has led to a definite plan for showing the distribution of health and medical services for children in various parts of each state to bring out disparities which may exist. Coding

*The report of the Committee for Study of Child Health Services was delivered in person by Dr. John P. Hubbard and Mrs. Elizabeth Lammie.

and tabulating of the information received will be carried out in the Central Office for analyses on a national level to make available to state pediatric groups basic data on facilities and services. This work has already been started and will continue as rapidly as the data are received from the states.

Respectfully submitted.

WARREN R. SISSON, Chairman
JOHN P. HUBBARD, Director
ALLAN M. BUTLER
HARVEY F. GARRISON
LEE FORREST HILL
JOSEPH I. LINDE
ARTHUR H. LONDON, JR.
JOSEPH S. WALL
JAMES L. WILSON

This report was accepted.

Mr. A. L. Rose of Mead Johnson and Company reported on the film, "When Bobby Goes to School" and asked that some revisions be made. This was referred to the Committee on Cooperation with Nonmedical Groups. He also reported on a small fund which is accumulating there, which he is going to place at the disposal of the Academy. He next offered a contribution for the development of a museum and library. This was referred to the Committee on a Library and Museum of Pediatrics for a conference and recommendations.

The term of office for Region V of Drs. Félix Hurtado, Víctor Escardó y Anaya, and Federico Gómez Santos was continued until the next meeting of the Academy at Pittsburgh.

Report of the Committee on Redistricting

With the addition of the new members elected today, the total number in each district will be as follows:

District 1	203	District 6	240
District 2	210	District 7	250
District 3	244	District 8	227
District 4	211	District 9	161 approximately
District 5	245		

It was decided that for the present we would pay for publicity by the meeting instead of by the year.

After discussion of scientific exhibits and their method of assignment the whole matter was left in the hands of the Secretary.

Respectfully submitted,
EDGAR E. MARTMER, Chairman

This report was accepted.

Report of the Committee on Cooperation With Nonmedical Groups

The Committee on Cooperation with Nonmedical Groups discussed a program at the annual meeting in Detroit. Contact is being made with a number of lay groups interested in children, offering medical assistance in their programs. The health card designed for camp use has had wide distribution. Several changes have been suggested to improve the card. These changes will be made at the next printing. No concrete program has been outlined for this year.

ALBERT D. KAISER, Chairman

This report was accepted.

Report of the Committee on Cooperation With Governmental and Medical Agencies

Due to the national situation concerning child health legislation, no formal meeting of this committee has been held since May, 1945, to give the Academy opportunity to clarify its policy with regard to the national situation. Two informal meetings, of such members of the Committee as were able to be present, were held in Detroit and New York to discuss future activities. In Detroit, the tentative decision of those present was that the committee should (1) reactivate the state programs in our forty-eight states and reconstitute able state committees, (2) to act as advisers to the Bureau of Food and Drugs of the Federal Security

Administration through a special subcommittee headed by Dr. Harold Murray of Newark, and (3) to promote our Academy-accepted national program in every possible way as an aid to the composition of the national child health situation.

At the New York meeting, Dr. Van Horn kindly offered to provide data as to state councils for children and youth, which have been formed in many states, and this information will be made available to our state committees as soon as they are reconstituted. In the meantime, the Academy state chairmen will receive this material.

A regular meeting of the Committee will be held in Pittsburgh at the time of the annual meeting of the Academy in November, 1946.

With the able assistance of Drs. Joseph Wall, Martha Eliot, A. Leonard Van Horn, Thomas Parran, R. C. Williams, Erval Coffey, Roger Lee, Louis Bauer, and Oliver Stringfield, the Committee sponsored a panel discussion at the regional meeting in New York on "Cooperative National Planning for Improving Child Health Services," which was very well received. It is hoped that a digest of this panel will be printed in the JOURNAL for the information of the Fellows.

In view of the fact that there has been no formal meeting of the Committee, the Chairman is enclosing his introductory statement at the panel discussion, which he requests be made part of this report as it covers the Committee's past progress and plans for the coming year, for the consideration of the Academy and the Executive Board. The United Nations Constitution states its purpose as follows: "To preserve peace and to promote social progress and better standards of life in larger freedom." This might well be the motto of our committee, and with our membership strengthened by the recent addition of those two able pediatric statesmen, Drs. Wilburt Davison and Joseph Wall, we shall do our best this year to promote cooperation between governmental and medical agencies at both State and National levels.

Respectfully submitted,

STANLEY NICHOLS, Chairman

This report was accepted.

Report of the Committee on School Health

Your Committee recommends the publication of the enclosed Resolution of the Association of State and Territorial Health Officers. In the opinion of your committee this resolution is a reasonable proposal to meet "the present impasse in the jurisdiction of school health between boards of education and departments of health" as mentioned in the Report of the Committee on a Consideration of Child Health in the Postwar Period (J. PEDIAT. 25: 625, 1944).

During the past year your chairman has served on several committees of the National Conference on Cooperation in Health Education. "Suggested School Health Policies," second edition, has recently been published after revision by the National Committee on School Health Policies of the National Conference for Cooperation in Health Education. Three Federal agencies and twelve national professional organizations nominated representatives to this committee including the Academy. Also Dr. Wheatley, of your committee, was nominated by the U. S. Children's Bureau. The report indicates the scope of the school health program and suggests policies acceptable to the representatives of the various educational, medical, dental, and public health associations. The report is significant as a type of interprofessional cooperation and is particularly recommended as a basis for the development of local and state policies. While different emphases in the report may be desired by one professional group or another, the two Academy members on this national committee recommend the report because it provides a common ground of opinion and a guide for much needed improvement that must be worked out on the local level. While such a cooperative report represents some compromise, the differences of the Academy representatives were wholly upon emphasis, and not upon principles.

The revision of the joint report, "Rheumatic Fever and the School Child," has not been completed and will be forwarded later.

Your Committee has given consideration to S. J. Res. 137, introduced by Senator Morse on January 29. This resolution authorizes the Department of Labor, acting through the Children's Bureau, to make certain studies of the health of school children. While this resolution neglects the important problem of Federal organization and jurisdiction in the distribution of funds, it should serve to encourage much needed fact-finding studies and demonstration of methods as a compromise measure. To this extent it is consistent with the position of the Academy. Dr. Martha Eliot writes concerning this resolution that the cooperation of the U. S. Public Health Service and the U. S. Office of Education would be sought in planning projects and considering relationships with the Academy study. We recommend that on Line 9 of the resolution a change be inserted after the word *"schools"*—the words—*"and health departments"* and in the *same line*—after the word *"physical"* there should be inserted *"and other handicapping."*

The Committee on School Health Proposes a Broader Objective for School Medical Service To Improve School Medical Service

The question, how we can improve the quality of medical service in school health programs, has long been of particular interest to the Academy. The problem involves not merely more thorough health examinations, but a better understanding and closer laison between the school health authorities and the practicing physician who cares for the child outside of school.

This can be best achieved through the leadership of the medical profession who are concerned with medical education. The physician serving school age children should have postgraduate education in this branch of pediatrics. This training should include, in addition, emphasis on techniques of personal health guidance to enable the physician more effectively to persuade and educate parents and teachers in the health care and education of children.

To embrace as large a proportion as possible of the medical profession in such a medical education program, and to engage the best qualified medical educators to participate in this medical educational program, health authorities should provide:

1. Part-time employment of school physicians for limited periods.
2. High standard in-service training courses with competent clinical instruction.
3. Reasonably generous remuneration* to the part-time physicians and to the teachers of the in-service training courses.

Physicians as Health Educators

There is a growing recognition of the importance of community programs for health education and yet there is little evidence of an appreciation of the possibilities of making use of the contribution that might be made by the medical profession. The doctor, who calls on the sick in the home, who advises and prescribes in his office, who serves in the hospital or clinic, has such opportunities for effective health knowledge if these occasions were used by physicians. Better health education by physicians can be achieved only through the channel of postgraduate medical education.

Pediatricians Teach Parents

The competent pediatrician who is able to maintain the kind of practice that brings well children to his office for advice and supervision certainly illustrates effective health teaching that represents the highest quality of public service. To extend this high standard of preventive medical practice, so that more physicians may give such health education for mothers and children, should be a more clearly defined objective of the public health program. It is then one of the needs that is desirable for the public welfare that more physicians should have an opportunity to learn how to give this high standard of preventive pediatrics and at the same time educate parents to understand that health advice is worth while.

*Such service should be paid at a rate for each hour of service at least equal to the average for an office visit to a qualified pediatrician.

Medical Education as Health Department Policy

While the American Academy of Pediatrics, the American Medical Association, and the American Public Health Association have all urged more postgraduate education of physicians as a fundamental requirement for a national health program, there has never been any well-defined policy or general acceptance by health departments or other governmental agencies below the Federal level of postgraduate medical education as an essential part of the public health program, except as has been necessary for the benefit of the treatment of venereal disease and occasional lectures to medical societies. We regard this as a serious neglect of an essential part of the public health program.

Child Health Services Offer Opportunity

We believe that school medical service and child care offers an opportunity for training of physicians in preventive pediatrics and health education of parents that is a fundamental requirement for the extension of improved medical service and health education. Such an objective of the public health program cannot be achieved through any known methods for teaching in an already overcrowded undergraduate medical curriculum.

Postgraduate opportunities in preventive pediatrics could reach many more medical practitioners if part-time school and child health conference positions in health departments were on limited tenure and provided postgraduate teaching on a par with the teaching in medical schools and many pediatric clinics. These services also should pay sufficient remuneration so that young well-trained physicians would be able to accept the service without financial sacrifice.

With competent teaching, the services would soon become very desirable and over a period of years would provide preventive pediatrics training to a large part of the profession serving children. Such a contribution to better medical service would be of great benefit to the public and would undoubtedly bring a better understanding of these public services to practicing physicians.

Public Funds to Benefit All the People

The limited efforts of the Federal services to train public health officials and other specialists to contribute to child health, while useful, have been altogether inadequate and never can meet the need for maintaining high quality of service throughout the country without a full acceptance of the responsibility for the administration at the local level.

This means that local health departments must use local funds for postgraduate medical education or funds from a Federal or State source with local planning and administration to improve the quality of medical service and not limit the medical educational opportunities to build up public health services without regard for the medical services rendered outside of the health department services. Public funds for improving the quality of medical service should benefit all of the people and the extension of postgraduate medical educational opportunities is essential for the improvement of preventive medicine for the whole population.

Health Department Physicians Learn Preventive Medicine

Fortunately the Health Department program generally calls for a development of preventive medical services by physicians giving part-time service to individuals so that teaching preventive medicine to part-time Health Department physicians can contribute to the larger objective of more and better preventive medicine for all the people. With limited tenure for the Health Department physicians the medical education program for preventive service can be extended to a large part of the profession and in turn benefit all the people served by the profession.

More Funds for Health Departments to Fulfill Their Mission

Of course, with Health Departments very short on funds for their services, there is a tendency to conserve those funds and to rely on administrative procedures rather than medical

education to improve the services, and yet with a growing realization of the necessity for more medical education to improve the quality of service, we should demand that public health services today fulfill their mission just as William Osler said at the turn of the century that "No hospital could fulfill its mission that was not a centre for the instruction of students and doctors."* We should then set as our objective a broad acceptance of the principle that Health Departments should employ part-time physicians on limited tenure with adequate remuneration, and the Academy should use these facilities to extend opportunities to general practitioners and young physicians to give better preventive services to children and to educate parents on the care of children's health.

The Example of the Veteran's Administration

It seems likely that the restrictions and rules and regulations of Civil Service Commissions will prove a handicap to such a program for medical teaching in Health Department Child Health Services, but we have an excellent recognition of this problem by the United States Veteran's Administration and the new law, signed by President Truman on January 3, creating a Veteran's Administration Bureau of Medicine and Surgery. This law authorizes the new Bureau to employ physicians outside of the normal requirements of civil service, and it has been brought out in the discussions of that legislation that the civil service requirements interfered with obtaining the most competent physicians.

Academy Leadership

The development of this proposal will require active leadership from the Academy and some plan for the development of a staff for teaching and for appointing the young physicians, according to the standards recommended by this Committee in 1942 and published in the *Journal of Pediatrics* in December, 1942, and also by the *American Journal of Public Health.*

A Plan for Teaching Physicians

This in-service course should provide for the pediatric teaching staff to observe the young physician in the Child Health services and for discussion of findings and recommendations and education of parents, seminars on growth and development, and round table discussion of common medical problems of children—such as nose and throat conditions, allergy, nutrition, endocrinology, rheumatic fever, and mental health.

Consultation services should be available and provision should be made for the physician in the schools to consult with a competent cardiologist, otologist, orthopedist, dentist, psychiatrist, dermatologist, and ophthalmologist on cases selected for referral to these services. The major portion of the teaching should be carried by the pediatrician but such consultation services should be available when indicated so that the highest standards of medical judgment may be maintained. Seminars with such consultants should be included to develop further information on the use of specialists in the care and supervision of children.

The report of the Committee on School Health was accepted.

Dr. Mitchell was invited to appear before the Executive Board at its next meeting to further elucidate the various phases of his committee report.

Report of the Committee on Hospitals and Dispensaries

We are at the present time taking up the question of standards for pediatric clinics. I have been in touch with the members of my committee but as yet there has not been sufficient time to collect material for this report.

Respectfully submitted,
JOHN A. BIGLER, Chairman.

This report was accepted.

*Cushing, Harvey: The Life of Sir William Osler, Vol. 1, p. 540.

Report of Committee on Legislation

Gentlemen:

I regret very much my inability to attend your meeting through the kind invitation of President Durand and Secretary Grulee, but, unfortunately, hearings on the Pepper-Norton bill have been initiated on the House side of the Congress and I have been asked to appear before the House Sub-Committee on Labor, Representative Augustine B. Kelley, chairman, on June 7, which date would coincide with the meeting of your Board in Chicago.

The following report, which must be regarded as that of the chairman of the legislative committee only, as we have had no meetings of the new committee appointed by President Durand nor any conferences by correspondence as yet, includes the steps taken by your chairman to present properly the opinions of the Academy on legislation in the process of hearings before the Senate Committee on Education and Labor and the House Committee similarly named, now considering the Pepper bill since May 28.

We were particularly anxious to have officers of the Academy appear before the Senate Committee in re S. 1606, the Wagner-Murray-Dingell bill, as Title I, Part B of this bill is a compressed version of the Pepper bill, and Senator Pepper has already proposed amendments which he will seek to have inserted in S. 1606 to make it comparable more closely to S. 1318 which he introduced.

Learning in March that hearings on the Wagner bill would start in April, I addressed the following communication to Senator James E. Murray, Chairman of the Senate Committee on Education and Labor, under date of March 10, 1946:

> Senator James E. Murray, Chairman, etc.
>
> Dear Senator Murray:
>
> I would respectfully ask permission to appear before your committee during the hearings on S. 1606 and also when S. 1318 will be under consideration.
>
> This request is made because of my official connection with the American Academy of Pediatrics, as chairman of its Committee on Legislation and with the Medical Society of the District of Columbia, as chairman of its Committee on Public Policy.
>
> Sincerely yours,
>
> JOSEPH S. WALL, M.D.

On March 25, I received a telegram from Senator Murray asking that I submit a written statement instead of appearing in person, as the time of the committee was limited, etc., etc.

The next day, on March 26, I addressed the following letter to Senator Murray:

> Hon. James E. Murray, etc., etc.
>
> My dear Senator:
>
> I was much surprised to receive your telegram requesting that the views of the American Academy of Pediatrics on the National Health Act be reduced to writing in substitution for an oral presentation before the Senate Committee on Education and Labor.
>
> I had been given to understand that *national* organizations would be heard in opposition and for some ten years, as Chairman of the Committee on Legislation, it has been my duty to represent the American Academy of Pediatrics in legislative or departmental matters.
>
> I trust that not only may my request be reconsidered, but that the President-Elect of the Academy, Dr. Lee Forrest Hill of 604 Locust St., Des Moines 9, Iowa, and the Assistant Secretary, Dr. Edgar E. Martmer of 693 Washington Road, Grosse Pointe, Michigan, be requested to appear personally before your committee.
>
> The American Academy of Pediatrics has a state-wide membership of nearly two thousand pediatricians who have an intimate interest in S. 1606, especially Title I, Part B, as well as in its general purposes.
>
> Sincerely yours,
>
> JOSEPH S. WALL, M.D., etc.

On March 29, the following telegram was received from Senator Murray:

Dr. Joseph S. Wall, etc., etc. Relet March 26 I understand and appreciate your interest in testifying personally on the National Health Bill. I deeply regret that during the hearings thus far scheduled there has been no opportunity allocate time for representatives of special aspects of medical science. However, the committee may decide to extend the hearings to hear witnesses such as yourself and I have appointed a special subcommittee to handle this question. Let me assure you that your request will be sympathetically considered by this subcommittee. In the meantime would appreciate it if you could send a written statement.

(signed) JAMES E. MURRAY, Chairman, etc., etc.

After some days, I learned that Senator H. Alexander Smith of New Jersey (with whom Dr. Stanley Nichols had enjoyed some contact already) would be made chairman of the subcommittee referred to by Senator Murray. Under date of April 15 the following letter was addressed to Senator Smith:

Hon. H. Alexander Smith
Committee on Education and Labor, U. S. Senate.
My dear Senator:

As Chairman of the Committee on Legislation of the American Academy of Pediatrics, I requested twice of Senator James E. Murray the opportunity of appearing before his committee in opposition to the Wagner-Murray-Dingell bill but was not accorded this request.

I would respectfully ask the privilege of appearing before the subcommittee as a representative of the organization named which is much interested in the welfare of children and in matters of legislation affecting their interests.

Sincerely yours, etc., etc.

On April 29, Senator Murray telegraphed me as follows:

Dr. Joseph S. Wall, Am. Academy of Pediatrics, 1864 Wyo. Ave.

Shall greatly appreciate your making arrangements for a representative of your organization to present testimony on National Health Bill before Education and Labor Committee on morning of Wednesday May 29. Please confirm with name and title of person who will speak for you.

JAMES E. MURRAY, etc.

In reply to this telegram, the following letter was sent:

Hon. James E. Murray, etc., etc.

I appreciate the opportunity of appearing before your committee on May 29, to testify on behalf of the American Academy of Pediatrics in opposition to the National Health Act as at present written.

As I have indicated in previous letters requesting this privilege as Chairman of the Committee on Legislation of the Academy, I would also request that there be permitted to appear the President-Elect, Dr. Lee Forrest Hill of 604 Locust St., Des Moines 9, Iowa, and the Assistant Secretary, Dr. Edgar E. Martmer of 693 Washington Road, Grosse Pointe, Michigan.

Very sincerely,
JOSEPH S. WALL, M.D., etc.

May 4, 1946.

No invitation was extended to Dr. Hill until such a late date that his appearance in person was out of the question. I have had no word from Assistant Secretary Martmer as to whether or not he received an invitation to appear from the Senate Committee.

This morning, May 31, I appeared before the Senate Committee on Education and Labor and presented a written statement which now follows, and which I trust reflects the views of the Academy on the legislation under consideration, the Wagner-Murray-Dingell bill. There were present at the hearing only Senators Murray and Donnell (of Missouri), the latter being strongly opposed to the bill. Senator Donnell, at the conclusion of the presentation, thanked me on the part of the Committee for my appearance and asked that I especially convey his appreciation to the Academy of Pediatrics itself.

The statement follows:

The objections of the Academy of Pediatrics to the enactment of S. 1606 are based upon the general principles that such would be deleterious to the interests of the children of the country, aside from its harmful effects upon the science of pediatrics and the education of pediatricians.

In justification for requesting the privilege of appearance before this Committee in opposition to the enactment of the National Health Act as at present written, we would submit the following information concerning the composition, activities and purposes of the American Academy of Pediatrics.

The Academy is a national organization of nearly 2,000 children's specialists. It is in reality an international and hemispherical organization inasmuch as its membership includes children's physicians in Canada, Mexico, Cuba, Puerto Rico, and all of the republics of South and Central America save one.

The purposes of the Academy of Pediatrics are set forth as follows in its constitution:

> Article III, Section 1: The object of the Academy shall be to foster and stimulate interest in pediatrics and correlate all aspects of the work for the welfare of children which properly come within the scope of pediatrics.
>
> The Academy shall endeavor to accomplish the following purposes:
>
> (a) To establish and maintain the highest possible standards for pediatric education in medical schools and hospitals, pediatric practice and research;
>
> (b) To perpetuate the history and best traditions of pediatric practice and ethics;
>
> (c) To maintain the dignity and efficiency of pediatric practice.
>
> (d) To promote publications and encourage contributions to medical and scientific literature pertaining to pediatrics; none of which objects is for pecuniary profit.

Furthermore, the Academy has demonstrated its active interest in the welfare of the children of the Nation by inaugurating last year a "study of child health services" throughout every State, county and city in our country. This study is now in actual progress under the direction of able administrators and investigators, and contemplates a work of two years' duration at a cost of approximately a half million dollars. The funds for this state-wide investigation of the needs of children have been provided from the limited reserves of the Academy itself and from other organizations interested in the welfare of children, including a grant-in-aid of 116 thousand dollars by the National Foundation for Infantile Paralysis. This study also has the assistance and cooperation of the U. S. Public Health Service and of the Children's Bureau of the U. S. Department of Labor.

The aims of the Academy and of its individual members are encompassed in the first paragraph of this study committee's report, namely: "To make available to all mothers and children in the United States of America all essential preventive, diagnostic and curative medical services of high quality, which, used in cooperation with the other services for children, will make this country an ideal place for children to grow into responsible citizens."

Our objectives and aspirations coincide exactly with those of the more vocal, social, and political reformers, utopian evangelists, and some fanatical crusaders

whose enthusiasm too often outruns the boundaries of common sense and realism. We, too, seek diligently the Holy Grail symbolic of perfection in mother and child protection from the vicissitudes of ill-health. Our quest differs not from that of the social crusaders, our goals and desires are equally alike, but the methods of attaining these ends, from our point of view, do not agree in many respects with the programs thrust upon us, usually without our knowledge and without the utilization of that experience we possess in the practice of pediatrics which should be recognized as necessary in determining the success or failure of any projected planning for child betterment.

The Academy approves of the objectives of Title I, Part A relating to grants to States for Public Health Services, but feels that greater effort should be made in health legislation to care for general measures of sanitation relating to factors bearing upon health such as water supply, food and milk supply, sewage disposal and the like. Nor can the Academy approve of the actual prohibitions contained in the National Health Act as outlined on page 13, lines 12 to 17 inclusive, to wit:

"The term does not include: construction of hospitals, water supplies, sewerage or other waste-disposal systems, or of other facilities; operation or maintenance of hospitals (except hospitals for persons afflicted with infectious diseases), water supplies, sewerage or other waste-disposal systems; and related matters."

Title I, Part B, is in reality an abbreviated version of S. 1318 (the Pepper bill), dealing with grants-in-aid to States for maternal and child health services, including the care of crippled children, although much of the detail of S. 1318 has been omitted.

The Academy sees no necessity for and objects to the blanket coverage for "all mothers and children in the State or locality who elect to participate in the program." (Page 16, lines 2, 3, and 4.)

Present organic law, the Social Security Act, as amended, provides for support from the Federal government to States, "especially in rural areas and in areas suffering from economic distress," under Title V, parts 1, 2, and 3, covering practically the identical needs of children now set forth in Title I, Part B, of the National Health Act of 1946, the coverage being limited because of the specification of funds to be allotted for these purposes.

The Academy has always urged that the Congress grant adequate appropriations to carry out such programs for maternal and child health and crippled children's services for needy persons. Representations have recently been made on the part of the Academy to the Ways and Means Committee of the House to remove the financial restrictions now specified under Title V of the Social Security Act, in order that more adequate funds shall be made available to the Children's Bureau to extend provisions of its present progress.

The absence of a "means test" with the opening of the doors in Title I, Part B, to "all mothers and children in the State or locality who elect to participate in the program" (page 16, line 8), together with the provisions of Title II, Section 201 (a), that—"Every individual, who is currently insured, and has been determined by the Board to be eligible for benefits under this title in a current benefit year, shall be entitled to receive personal health benefits," constitute serious objections, in the opinion of the Academy, to the adoption of such legislation.

An Act conceived to provide adequate medical care for those in low economic groups, which actually discriminates against these individuals by diminishing funds available for their medical care due to the inclusion of all persons, regardless of income or financial status, is certainly of questionable justice or equity.

We object to the provisions of Title I, Part B, and of Title II, because of the omission of an adequate and equitable means test in determining eligibility for benefits under the program. On the other hand, the Academy of Pediatrics favors the expenditure of Federal and State moneys for the benefit of those in need and unable to provide proper medical care for their own resources.

Strange as it may seem, the proposed National Health Act *does* incorporate in its paragraphs several means tests, one of which is implied and others directly named, one of the latter having application both to "the quick and the dead."

The first means test of sorts is that which specifies a ceiling to taxable wages up to $3,600 a year, although not mentioning a floor, but which thereby excludes all but the wage earner (or self-insured, page 76, lines 14, 15, and 16) from personal health benefits under this section. This exclusion from personal health benefits of persons who have no "means," who are furthermore, the very individuals whose need the Act is intended to relieve from a humanitarian standpoint, is supposed to be rectified by Section 209 (a) of Title II, which reads as follows:

"Notwithstanding any other provision of this title, any or all benefits provided under this title to individuals entitled to such benefits may be furnished to other individuals for any period for which equitable reimbursements to the Account on behalf of such other individuals have been made or for which reasonable assurance of such reimbursements has been given by public agencies of the United States, the several States, or any of them or of their political subdivisions, such reimbursements to be made in accordance with agreements and working arrangements negotiated by the Surgeon General with such public agencies and in accordance with contracts into which the Surgeon General may enter. Services furnished as benefits to such other individuals shall, as far as may be practical in each area, be of the same quality, be furnished by the same methods, and be paid for through the same arrangements, as services furnished to individuals entitled to benefits under this title."

The confusion of such compensatory provisions and the extreme probability that they will ultimately be utterly unenforceable by reason of the complicity and obvious entanglements inherent in the scheme, may readily be appreciated, and may well strike terror to the hearts of State Health Administrators who are not without some unhappy experiences in the administration of sundry other Federal-State legislative acts.

A second means test appears under the caption—"Medical Care for Needy Persons," on page 28, beginning with line 4, to wit: (8) "Provide that the State agency shall, in determining need for medical care, take into consideration (A) the requirements of individuals claiming medical care under the plan, and (B) ANY INCOME AND RESOURCES of an individual claiming medical care under the plan, which must be taken into consideration with regard to an individual claiming assistance under a State plan approved under the Social Security Act, as amended."

The following Section 133, (b) (2), also concerns itself with the financial testing of needy persons with a closing paragraph relating to a means test for the dead, to wit: "Provided, That any part of the amount recovered from the estate of a deceased recipient which is not in excess of the amount expended by the State or any political subdivision thereof for the funeral expenses of the deceased shall not be considered as a basis for reduction under clause (B) of this paragraph."

Thus it will be seen that certain means tests are found in the proposed Act, but afar from the usually acknowledged purposes of such eligibility requirements, are to be applied to the lowest stratum of society, the poor, the needy and the unemployed, while the individual, to whom a means test should in all equity and justice *be* applied, is utterly excluded from such an examination. Not only that, but the bill welcomes him with open arms to its health benefits, whether he be a bank president, a moving-picture magnate, or other "malefactor of great wealth." The invitation is extended in line 13, page 77, which states: "The term 'employee' also includes an officer of a corporation!"

In the light of these paradoxical provisions of the proposed Act, the prophetic words of Saint Matthew become crystal clear as recorded in the 25th chapter, 29th

verse of the Parable of the Talents, where is written—"For unto every one that hath shall be given, and he shall have abundance; but from him that hath not shall be taken away, even that which he hath."

The framers of the bill naively admit that strong possibility of its failure to accomplish the ends intended by actually writing into its content the following strikingly prophetic passages, to wit:

> Section 204(f), page 47, beginning on line 10: "The methods of administration, including the methods of making payments to practitioners, shall—
> (1) insure the prompt and efficient care of individuals entitled to personal health service benefits;
> (2) promote personal relationships between physician and patient;
> (3) provide professional and financial incentives for the professional advancement of practitioners and encourage high standards in the quality of services furnished as benefits under this title through the adequacy of payments to practitioners, assistance in their use of opportunities for postgraduate study, coordination among the services furnished by general or family practitioners, specialists and consultants, laboratory and other auxiliary services, coordination among the services furnished by practitioners, hospitals, public-health centers, education, research, and other institutions, and between preventive and curative services, and otherwise;----"

Testimony before this committee by witnesses fully informed as to the facts demonstrates beyond all doubt that the treatment of patients under governmental systems now in existence abroad, is neither prompt nor efficient. If the adjective "prompt" is used to denote swiftness and dispatch, observations of the working of the panel system in the average English "surgery" would fully bear out the designation of "prompt," all of which is not consonant with the designation of "efficient," but denotes an opposite relationship.

The promotion of "personal relationships between physician and patient," named in this section of the bill, implies the frank admission that the proposed Act will destroy those sacred obligations which now pertain to this confidential accord. The numerous detailed reports incident to administrative techniques, subject to the inquisitive scrutiny of hundreds of government employees, would alone jeopardize confidential relationships between physician and patient, to say nothing of the impossibility of preserving such a relationship in the fast-moving whirl of mass practice of medicine associated with assembly line methods of procedure.

In regard to the effect of the proposed act upon medical education, we would refer to the excellent summary submitted to this committee on April 17, 1946, by Dr. Victor Johnson, Secretary of the Council on Medical Education and Hospitals of the American Medical Association, in which he has outlined the historic development of medical education in the Nation to its present high level, solely through private initiative and the force of public opinion.

In contrast to this continuous trend toward higher standards and greater opportunities for the education of undergraduate and graduate physicians, Dr. Wilburt Davison, Dean of Duke University Medical School, reports the following observations concerning his study of medical education in Germany which has witnessed, under socialized medicine, the decline and fall of medical teaching with total destruction of the high standing once the enviable position of German medicine and formerly acknowledged throughout the world. This study was made at the behest of the U. S. Army. (Trans. of the Association of American Medical Colleges, Vol. 21, No. 3, May, 1946.) Dr. Davison reports as follows:

"The German medical schools, which were good in 1912, have not kept pace with the advances in medicine. Except for an occasional specialist who has become famous, the German graduates, even those who took postgraduate work as assistants, are not equal to the average American senior medical student. The reasons are: Lectures without adequate laboratory and clinical work; too many

students with little or no selection (of the 6,000 total university students at pre-war Munich, 4,000 were medical); inadequate facilities; and faculties which are too small, the members of which do not know modern non-German medicine, whose salaries depend upon the number of their students so that they are tempted to encourage an increased enrollment, who also examine their own students and thus may lower standards, and who have too much private practice. Furthermore, the segregation of research workers from the medical schools into Kaiser Wilhelm Institutes has reduced the productiveness of German medicine so that the medical journals for a generation have been of little scientific value. As a result, although accurate figures are not available, German physicians, in addition to being poorly trained, are too numerous. Unfortunately most of the Germans do not realize that improvement, reorganization, limitation and supervision of medical education are necessary."

Munich is a word made infamous throughout the civilized world as expressive of weakness, intrigue, and failure. It may now assume the honor of representing the German center of diploma mills to supply the "panel doctors" needed in their system of socialized medicine although they possess only the qualifications of the average fourth year American medical student!

As to the status of graduate physicians in England, the Secretary of the British Medical Association, several years after the institution of State medicine in that country, admitted that the Ministry of Health had to form classes to educate physicians through postgraduate courses because of their lack of knowledge in the care of children.*

The Academy of Pediatrics would ask the framers of the bill what constitutes a "practitioner," as the term occurs in the pages of the proposed Act?

If the health and lives of young infants and children, who are entirely bereft of the ability to exercise judgment in the choice of a physician, will be entrusted to the tender mercies of cultists, pseudophysicians, and various ill-trained camp followers of the profession of healing, what of the evil results upon the health and lives of the young of our country?

Throughout the bill there is no definition or designation as to what constitutes a "physician" or a "practitioner," but a number of terms are used which vary in verbiage and significance.

The following variations occur:

Page 44, lines 2 and 3: "general or family practitioners."

Page 45, lines 14 and 15: "practitioner or group of practitioners."

Page 45, line 22: "the practitioners."

Page 46, line 8 et seq: States, "In establishing such standards and in designating such specialists or consultants the Surgeon General shall utilize as far as it is consistent with the purposes of this title standards and *certifications* developed by competent professional agencies and shall take into account the personnel resources and needs of regions and local areas." This phraseology evidently limits the selection of specialists and consultants to persons holding the degree of doctor of medicine as such as the only practitioners of the healing art who are subject to "certification" by duly accredited boards of examiners in the various specialities.

Page 47, line 1, occurs: "The names of medical and dental practitioners."

Page 47, lines 5 to 9: "Such lists of names shall include general *or* family practitioners and qualified specialists and consultants, respectively, and with respect to qualified specialists and consultants the class or classes of specialist or consultant services for which each has been qualified."

Page 48, lines 9 and 10. Herein first appears the phraseology: "general *medical* and family practitioners." Does this wording designate holders of the degree of doctor of medicine only, who are to receive "payments from the Account"?

*Personal interview with the writer.

Page 48, lines 21 and 22, repeat the words "general *medical* and family practitioners," as do several paragraphs in subsequent pages of the bill.

Page 60, line 6. Now appears the word "physician" for the first time. What is its meaning?

Page 50, line 18: Speaks of a "general or family practitioner," while a continuation of this section on page 54, line 6, contains the designation "general *medical* or family practitioner." Paragraph (m) of the same section, lines 10 and 11, uses the words "the advice of a legally qualified attending physician."

Page 57, line 10, the word "physician" appears again.

Sec. 213, pages 63 and 64: "The Surgeon General is hereby authorized and directed to administer grants-in-aid to nonprofit institutions and agencies engaging in research or in undergraduate or postgraduate professional education." One may ask what is encompassed in this directive and does it apply to institutions granting the degree of doctor of medicine only?

Sec. 214, page 65, carries the caption "DEFINITIONS" and reads as follows: Paragraph (b): "The term 'general medical benefit' means services furnished by a legally qualified physician or by a group of such physicians, including all necessary services such as can be furnished by a physicinn engaged in the general or family practice of medicine, at the office, home, hospital or elsewhere, including preventive, diagnostic, and therapeutic treatment and care, periodic physical examination."

The above queries are based upon the evident ambiguity of Section 205, (a), page 45, reading as follows in part: "Any physician, dentist, or nurse *legally qualified by a state* to furnish any services included as personal health service benefits under this title shall *be qualified to furnish such services* under this title, etc."

If the National Health Act proposes to entrust the health and very lives of the citizens of the Nation, more especially of its children, in which we are particularly interested, only to legally qualified physicians holding the degree of doctor of medicine, such a concrete definition should appear under the heading of "definitions" and should apply in retrospect to the several designations of "practitioners" throughout the body of the bill.

Perhaps the bill was drawn to include various cultists and so-called practitioners of the healing arts who attempt to cling to the skirts of medicine but in reality form but a fringe of imposters possessing no medical learning, but endowed with an abundance of egotistical guile and deceit. The members of the profession of medicine we represent are entitled to know the answers to these queries concerning their possible bed-fellows in event of the adoption of this legislation.

The Academy of Pediatrics objects to a single individual being given the over-all medical care of 130 millions of Americans, with a segment of some 40 million children transferred to the Children's Bureau as physician-in-chief. It is not unthinkable that the executive of these two governmental bureaus who are its present distinguished and able incumbents, might, through changing political fortune, be replaced by others whose ability to administer successfully affairs of health of such magnitude would be questionable.

In this connection, I would bring to your attention a report by a subcommittee of the Advisory Committees of the Children's Bureau on Maternal and Child Health Services and on Services for Crippled Children which was adopted by the committee of the whole on November 9, 1945. The subcommittee report was prepared and presented by Dr. Allan M. Butler, who has previously testified before this committee of the Senate. The wording of the report is as follows:

This committee discussed many fundamental principles pertaining to such legislation as proposed in S. 1318:

"Certain reservations as regards the jurisdiction of the Federal administrative agency under this bill, its departmental allocation and the integration of this agency and the proposed maternal, infant, and child medical care program with other Federal health plans were discussed. Before giving critical consideration to the details of the proposed legislation, the Committee wishes to make it clear that such consideration does not necessarily constitute an endorsement of the proposed allocation to a bureau in the Department of Labor of authority to develop and direct such an extensive medical care program.

"The Committee recognizes the far-reaching and significant contributions of the Children's Bureau to maternal and child health, especially in the fostering of high standards of medical and welfare services. However, in such a program as envisaged in this major step in the development of a Federal Health Program problems of State's responsibilities and relationships with Federal agencies are involved which demand consideration of ability to integrate the proposed program with those for the provision of health and medical services for the remainder of the population.

"The Committee recommends that Congress give careful study to the problem of the proper agency to conduct this program and of the relationship between governmental agencies concerned with medical and health services."

The distinguished Senator from Florida has read to this Senate Committee certain amendments he is proposing, during the presentation of which he used the following words:

"Last year, I introduced (for myself and Mr. Walsh, Mr. Thomas of Utah, Mr. Hill, Mr. Chavez, Mr. Tunnell, Mr. Guffey, Mr. LaFollette, Mr. Aiken and Mr. Morse) Senate Bill 1318, whose purpose is to provide for adequate maternal and child health and crippled children's services and child welfare services in all the states.

"Although all of the provisions set forth in S. 1318 are not specified in this bill to which we are now addressing ourselves, some will be included in amendments which are being proposed____"

"Let me add only that those amendments are proposed after long consultation and most sympathetic cooperation among the sponsors of the two bills. I happen to be one of the sponsors of the Maternal and Child Welfare bill and am in favor of its passage, but I am equally strong in my support of the pending measure, the Wagner-Murray-Dingell bill, and we have worked together, the Children's Bureau and others who are sponsors of the Maternal and Child Welfare bill, so that these amendments might be fitted into 1606, and if 1606 should be adopted, then it would cover, essentially, what appears in the Maternal and Child Welfare bill also."

In view of the fact that there may be this merging of some of the principles of S. 1318 with S. 1606, now under consideration by you, I would respectfully ask permission of the chairman to submit for the record an analysis and report on S. 1318 submitted by the Committee on Legislation of the American Academy of Pediatrics and adopted by the latter at its annual meeting in Detroit, January 15-18, 1946.

In conclusion, I would call your attention to the following resolution adopted by the Academy of Pediatrics on January 17, 1946, to wit:

"The American Academy of Pediatrics in annual session at Detroit, Michigan, January 15-18, 1946, after careful consideration of proposed legislation in Congress as it relates to child health services reaffirms its resolution as adopted at its 1939 session, namely:

" 'That the American Academy of Pediatrics, regarding the provisions for maternal and child welfare (referring to the National Health Act of 1939), favors the use of public funds to provide *such services to those groups*

of the population unable to pay for medical services, to the end that the standards of medical care may be maintained at a high level among such groups.'

"The Academy of Pediatrics does not favor the use of Federal funds for those able to provide good medical care from their own resources.

"The Academy directs the attention of those considering proposed legislation to its fact-finding study of child health services now in progress which, at its conclusion, should assist in the development of sound programs at state levels based on demonstrated needs.

"Pending the completion of this study, it is recognized that urgent needs exist in some states that should be met in the immediate future. To this end the Academy recommends that additional Federal funds be made available for grants-in-aid to the states under existing Maternal and Child Health and Crippled Children's programs of Title V of the Social Security Act, as amended in 1939.

"The Academy would welcome the privilege of sending its representatives now or at any time to confer with those responsible for the preparation of legislation pertaining to child health."

Dr. Martha M. Eliot requested me as chairman of the committee on legislation, if it met with my accord, to write to Chairman Doughton of the House Ways and Means Committee asking that the limitations now existing in the Social Security Act, as amended, relating to appropriations under Title V, Parts 1, 2, and 3, be lifted to assure larger funds for the administrations of this title.

Inasmuch as the Academy asked additional funds for these purposes under the resolutions introduced by Vice-President Hill at its last meeting and adopted by the Academy, the following letter was written to Congressman Doughton and acknowledged by him upon its receipt:

May 21, 1946

Honorable Robert L. Doughton,
Chairman,
Ways and Means Committee,
House of Representatives,
Washington 25, D. C.

Dear Mr. Congressman:

It is my understanding that the Ways and Means Committee now has under consideration certain changes in the Social Security Act, including the possible removal of the present limitations on sums appropriated in connection with carrying out the purposes of Title V, Parts 1, 2, and 3, relating to maternal and child health services and crippled children.

As the representative of the American Academy of Pediatrics, a national organization of childrens' physicians, and the chairman of its committee on legislation, I would respectfully call to the attention of your committee the urgent recommendations of this body concerning the provision of adequate funds by the Federal Government to assist the States, "especially in rural areas and in areas suffering from economic distress," by enabling the Children's Bureau which administers Title V, Parts 1, 2, and 3, to fulfill the functions demanded of it by the provisions of the Social Security Act.

This Federal Bureau, since the creation of the Act by the Congress, has carried out its obligations relating to maternal and child health and care of crippled children through arrangements with the State agencies in an exemplary and highly satisfactory manner, being handicapped only by the limitations in the funds available for these purposes.

The Academy of Pediatrics believes that the statutory provisions of the organic Act now under your consideration would fulfill the needs, where need is

demonstrated, of mothers and children if adequate appropriations were made by the Congress to accomplish the objectives of Parts 1, 2, and 3, of Title V, without the necessity of the passage by the Congress of several legislative proposals now pending which are of questionable utility, as evidenced by the pronounced opposition developed by committee hearings.

I would submit for the consideration of your committee the following resolutions adopted by the American Academy of Pediatrics at its annual meeting in Detroit, January 15-18, 1946, to wit:

The American Academy of Pediatrics in annual session at Detroit, Michigan, January 15-18, 1946, after careful consideration of proposed legislation in Congress as it relates to child health services reaffirms its resolution as adopted at its 1939 session, namely:

"That the American Academy of Pediatrics, regarding the provisions for maternal and child welfare, favors the use of public funds to provide such services to those groups of the population unable to pay for medical services, to the end that the standards of medical care may be maintained at a high level among such groups."

The Academy of Pediatrics does not favor the use of Federal funds for those able to provide good medical care from their own resources.

The Academy directs the attention of those considering proposed legislation to its fact-finding study of child health services now in progress which, at its conclusions, should assist in the development of sound programs at State levels based on demonstrated needs.

Pending the completion of this study, it is recognized that urgent needs exist in some States that should be met in the immediate future. To this end the Academy recommends that additional Federal funds be made available for grants-in-aid to the States under existing Maternal and Child Health and Crippled Children's programs of Title V of the Social Security Act, as amended in 1939.

The Academy would welcome the privilege of sending its representatives now or at any time to confer with those responsible for the preparation of legislation pertaining to child health.

Respectfully submitted,
JOSEPH S. WALL, Chairman,
Committee on Legislation
American Academy of Pediatrics.

The report of the Committee on Legislation was accepted and it was voted that a letter of thanks be sent to Dr. Joseph S. Wall for his work in appearing before the Senate Committee representing the American Academy of Pediatrics.

Report of the Committee on Mental Health

The Committee on Mental Heath expects to complete the motion picture "Mental Growth During the First Two Years of Life" this summer.

Respectfully submitted,
BERT I. BEVERLY, Chairman

This report was accepted.

Report of the Committee on Latin-American Scholarships

It has long been the desire of the members of this committee to have an exchange of fellows with the Latin-American countries. The chairman, having visited the city of Mexico, realized the quality of service that was being rendered in the Hospitale Infantile and, at the time, Dr. Gomez suggested the possibility of one or two Americans coming to Mexico. It has since been in the mind of the committee that such an arrangement might be very beneficial.

At a recent meeting of the Public Health Committee of the Kellogg Foundation, the executive staff of the Foundation expressed its willingness to finance two such scholarships, allowing for payment of transportation to and from Mexico City as well as a monthly stipend. When this offer was communicated to Dr. Gomez, he was very willing that such be the case and included in his letter a note from the official authorities of the hospital saying they were offering places to two young American physicians who might want to come to the hospital to spend eighteen months as interns. They would give room, laundry, board, and training in the medical and surgical pediatric field.

The mode of selection of the fellows has been taken under advisement by your Committee and the relationship of such service as credit by the American Board of Pediatrics' Examiners will be determined.

Respectfully submitted,

HENRY F. HELMHOLZ, Chairman

The report of the Committee on Latin-American Scholarships was accepted. It was moved, seconded, and carried that we recommend to the American Board of Pediatrics that they consider the Children's Hospital in Mexico City a good place of training for American physicians.

Dr. Clifford G. Grulee reported meeting with the Committee on Pediatric Awards at the American Pediatric Society meeting at Skytop, Pa., and discussing with them several phases of their work. This committee is quite active and will report its decisions at the meeting in Pittsburgh.

Dr. Edgar E. Martmer reported his activities as chairman of the Program Committee with respect to the program.

Report of the Committee on Geographical Distribution of Pediatricians

On account of the recent epidemics in Cleveland and vicinities, our activities in the work have been curtailed. There have been some delays in answering letters referred to me by your office.

The work on a revised map together with clearing the desk of delayed correspondence is the plan for the next few months, and I am hoping to be up to date shortly.

A questionnaire to the various pediatric hospitals and pediatric departments of these hospitals, relative to recent or prospective graduates interested in locations with Fellows of the Academy of Pediatrics who are looking for suitable assistants in their private practice, would be timely and would help the Fellows in their search for such qualified men.

Respectfully submitted,

OTTO L. GOEHLE, Chairman

The report of the Committee on Geographical Distribution of Pediatricians was accepted, but it was decided that it would not be wise at this time to send out a questionnaire.

Report of the Committee of Mother's Milk Bureau

My correspondence from members of the Committee of Mother's Milk Bureau sums up reports on the difficulties experienced in various localities in obtaining the services of mothers able and willing to furnish breast milk.

The committee members are united in the thought that there is a necessary place for breast milk in infant feeding. Furthermore, the question has arisen as to whether this Academy should not start a publicity campaign in favor of breast feeding.

The committee is asking for a place on the program of the Pittsburgh meeting for the discussion of Breast Feeding and Mother's Milk Bureaus, leaving it to your judgment as to the best place to present them.

Respectfully submitted,

JULIUS H. HESS, Chairman

This report was accepted.

Report of Committee on Rheumatic Fever

Following the meeting of this committee in Detroit in January, a few members met in New York in April at the time of the Region I meeting to discuss the Statement on Rheumatic Fever which was submitted to the Executive Board and which was not unanimously approved. By recommendation of the committee members present, this statement is now under revision, and will be cleared by our Committee and the School Health Committee. This latter committee had a joint responsibility in the framing of the original statement.

Two of the members of the committee, as members of the Rheumatic Fever Advisory Committee of the Children's Bureau, met in Washington, D. C. on April 29 and 30 to review the present status of State rheumatic fever programs; to discuss methods for their evaluation; to explore needs and trends in the future expansion of these State services; and to review policies of the Children's Bureau relating to the rheumatic fever program. This conference was most provocative and from it came certain recommendations from the Advisory Committee.

It has been thought wise and timely to hold a conference for professional groups in the near future. The subject would be Rheumatic Fever and the conference would be sponsored by the Academy of Pediatrics. To it would be invited all the national groups within the Council of Rheumatic Fever and any other groups which might contribute to its success.

Respectfully submitted,

ALEXANDER T. MARTIN, Chairman

This report was accepted.

Report of the Committee on National Defense

I have just learned from the United States Committee for Care of European Children that additional groups of children are to arrive in this country shortly. They are to be housed in a reception center in New York City where pediatric examinations and care will be required. As you know, in the past the Committee on National Defense has undertaken the examination and routine care before placement. I understand that several hundred children are to be included in this quota, and Dr. Stimson and I will obtain the services of pediatricians for the medical care of these youngsters.

Respectfully submitted,

CARL H. SMITH, Chairman

This report was accepted.

Report of the Committee on Postwar Courses in Pediatrics

Total number desiring refresher courses	39
Total number desiring residencies	283
Total	322
Men placed in residencies	98
Men placed in refresher courses	19
Number desiring refresher courses but not heard from	13
Number desiring residencies but not heard from	111
Total	124
Number desiring refresher courses on active list	26
Number desiring residencies on active list	169
Total	229

There are approximately ten refresher courses being offered.

There is only one residency being offered this year. There are approximately 30 being offered for 1947. How many of these are already filled we do not know.

Equivalent courses are being offered at the following institutions:

Babies Hospital (Coit Memorial), Newark, N. J.

Knoxville General Hospital, Knoxville, Tenn.

Hartford Hospital, Hartford, Conn.
Raymond Blank Memorial Hospital, Des Moines, Iowa.
Roosevelt Hospital, New York, N. Y.
Germantown Dispensary, Germantown, Philadelphia, Pa.
Graduate Hospital of University of Pennsylvania, Philadelphia, Pa.
Western Pennsylvania Hospital, Pittsburgh, Pa.
St. Lukes' and Children's Medical Center, Philadelphia, Pa.
St. Joseph Hospital (Creighton Memorial), Omaha, Neb.
Franklin Hospital, San Francisco, Calif.
Babies Hospital of Wilmington, Wilmington, Del.
Mt. Sinai Hospital, Chicago, Ill.
Beth Israel Hospital, New York, N. Y.
Brooklyn Hospital, Brooklyn, N. Y.
Hermann Hospital, Houston, Texas
Salem Hospital, Salem, Mass.
Presbyterian Hospital, Charlotte, N. C.
Sternberger Hospital for Women and Children, Greensboro, N. C.
Rex Hospital, Raleigh, N. C.
St. Michael's Hospital, Newark, N. J.
Rochester General Hospital, Rochester, N. Y.
Jewish Hospital, St. Louis, Mo.
Children's Mercy Hospital, Kansas City, Mo.

The postage spent by this committee since December, 1945, amounted to $64.63. This is approximately 2,154 letters.

Respectfully submitted,
CLIFFORD G. GRULEE, Secretary-Treasurer

This report was accepted.

Report of the Committee on Tumor Registry

A meeting of this committee was held April 29, 1946.

The objective of this committee is the reduction of the mortality from neoplasms during childhood.

During the war our activities were limited to the collection of data upon clinical material.

Since Jan. 1, 1946, the developments have been:

A statistical study of the cases in the registry is in progress.

An exhibit of childhood neoplasms consisting of photographs and statistical charts has been prepared for the use of medical groups and nonmedical groups interested in health education.

The diagnostic service of the consulting board of pathologists is again available.

A secretary has been engaged.

The clinical, pathologic, research, and statistical facilities of the Memorial Hospital for Cancer and Allied Diseases, New York City, have been made available to us.

A grant to defray our expenses during the year 1946 has been received from the American Contract Bridge League.

The committee believes the general lack of knowledge on the part of the laity that children may suffer from cancer is a serious obstacle to the attainment of our objective.

The committee therefore recommends that the Children's Bureau of the United States Department of Labor be requested to include a paragraph on this subject in its widely distributed booklet, *Infant Care*.

Respectfully submitted,
HAROLD W. DARGEON, Chairman
HAYES E. MARTIN
HERBERT F. JACKSON

This report was accepted.

There were no reports received from the following Committees:

Committee on Contact Infections
Committee on Cooperation with American Legion
Committee on Fetus and Newborn
Committee on Medical Education
Committee on Mental Health
Committee on Honorary Fellows
Committee on Immunization and Therapeutic Procedures for Acute Infectious Diseases
Committee on Nursing Education
Committee on a Library and Museum of Pediatrics
Committee on Nutrition

The question of the International Congress was discussed extensively with Dr. Henry F. Helmholz present. It was decided to hold a meeting of Region V immediately preceding the meeting of the International Congress. Dr. Félix Hurtado was made chairman of the program committee for this meeting.

The question of a $10.00 assessment to help finance the International Congress of Pediatrics was to be presented to the members at the meeting of the Academy at Pittsburgh. It was approved that three members of the Academy be named by the President to act on the planning committee of the International Congress.

It was voted that the Fellowship Blanks be amended to incorporate within them the service records of men during World War II.

With respect to awards of the American Public Relations Association the secretary was empowered to present our qualifications for such awards to that body at a time when Dr. Joseph S. Wall felt that it was desirable.

MEETING ADJOURNED.

The Academy received the following questionnaire from the office of Senator Murray, Chairman of the United States Senate Committee on Education and Labor, seeking an answer to the question, "What are our objections in the nation's health?" The same question had been sent out to other leading professional agencies throughout the country.

March, 1946

Questions on
Health Goals for America's Future

I. Over the next 5 years, what should be our goals on the nation's health? What should our aims be with respect to increasing the average expectation of life?

What should our aims be in reducing—

a. the infant mortality rate?
b. the maternal mortality rate?
c. the death rate at various ages?

What should our aims be in preventing or controlling—

a. heart disease?
b. cerebral paralysis?
c. cancer?
d. tuberculosis?
e. diabetes?
f. pneumonia?
g. poliomyelitis?
h. rheumatism and arthritis?
i. rheumatic fever?
j. venereal disease?
k. malaria?
l. dental defects?

m. defects of vision?
n. defects of hearing?
o. mental ill-health?

II. Over the next 5 years, what should be our goals on health personnel, facilities, and education?

What should our aims be with respect to the number and distribution of qualified—
a. doctors?
b. dentists?
c. nurses?

What should our aims be with respect to the number and distribution of adequate—
a. hospitals and hospital beds?
b. health clinics and health centers?
c. sanitation facilities?

What should our aims be with respect to—
a. medical research?
b. professional medical education?
c. health education for the public?

At the meeting of the Executive Board of the Academy in New York at the time of the meeting of Region III, the following reply was formulated, approved, and sent to Senator Murray.

QUESTIONS AND ANSWERS ON HEALTH GOALS FOR AMERICA'S FUTURE

The American Academy of Pediatrics is the national society of physicians especially trained in the care of infants and children. It is the outgrowth of the American Child Health Association and has for its purposes the promotion of the health of children and support of various medical activities in the field of pediatrics.

This group wishes to present the following reply to the questionnaire presented to it by Senator Murray in his letter of March 18, 1946.

I. Over the Next 5 Years, What Should Be Our Goals on the Nation's Health?

PRELIMINARY STATEMENT

Health goals for children cannot be separated from such public health and welfare measures as:

A. Adequate housing
B. Proper clothing
C. Sufficient, proper food
D. Sanitary living conditions including:
    (1) Safe water supplies
    (2) Proper sewage
    (3) Pasteurization of milk
    (4) Proper food inspection including:
        (a) Inspection at source
        (b) Inspection during processing
        (c) Proper sanitary preparation for consumption.

Progress in the field of child health is directly proportional to the degree that society both individually and collectively recognizes the importance of the above-mentioned measures and takes the necessary steps to improve them.

What Should Be Our Aims With Respect to Increasing the Average Expectation of Life?

The American Academy of Pediatrics has defined pediatrics as covering the age period from birth well into adolescence usually between sixteen and eighteen years. With a reduction

in infant mortality some individuals who would heretofore have died during the first year of life can be expected to die during childhood and adolescence but the great increase in the average expectancy lies in the treatment of the degenerative diseases and the hazards of increasing age which do not fall in the field of pediatrics.

What Should Our Aims Be in Reducing:

a. the infant mortality rate?

Over the next five years our goal should be to reduce infant mortality in all states to the same degree as in the States of Connecticut (29.8), Oregon (30.0), Minnesota (30.9), Utah (31.4), Idaho (32.0), New York (32.7), Illinois (33.3), Kansas (33.6), New Jersey (33.7), and Iowa (34.0). A definite and considerable reduction can be immediately brought about by the application of known facts, concerning prenatal and infant care in areas where high infant mortality rates exist.

A further reduction in infant mortality, especially during the first month of life, may be possible through scientific discoveries and medical progress and the universal application of such knowledge.

b. the maternal mortality rate?

Since pediatrics is concerned with the infant, child, and adolescent, the American Academy of Pediatrics suggests that other groups are qualified to answer this question. Reduction of neonatal deaths and reduction of maternal deaths are inextricably associated with good obstetrics.

c. the death rate at various ages?

The chief causes of death in the age group in which we are particularly interested, that is, from birth to eighteen years,* are:

Under One Year

Causes	*Deaths*
All Causes of Death	345,925
Congenital malformations and diseases of early infancy	204,237
Influenza and pneumonia	51,080
Diarrhea and enteritis	25,800
Accidents	8,584
Whooping cough	6,789
Diseases of thymus gland	3,213
Dysentery	2,976
Syphilis, all forms	2,626
Hernia and intestinal obstruction	1,966
Meningitis (not due to meningococcus)	1,939

Age One

Causes	*Deaths*
All Causes of Death	32,760
Influenza and pneumonia	8,494
Accidents	4,641
Diarrhea and enteritis	3,837
Whooping cough	1,707
Congenital malformations	1,645
Tuberculosis, all forms	1,531
Measles	952
Dysentery	676
Meningitis (not due to meningococcus)	548
Diphtheria	532

Age Two

Causes	*Deaths*
All Causes of Death	16,488
Accidents	3,502
Influenza and pneumonia	3,093
Diarrhea and enteritis	1,000
Tuberculosis, all forms	790
Congenital malformations	629
Diphtheria	601
Whooping cough	519
Measles	456
Appendicitis	401
Leukemias and aleukemias	378

Age Three

Causes	*Deaths*
All Causes of Death	11,718
Accidents	3,054
Influenza and pneumonia	1,641
Diphtheria	527
Tuberculosis, all forms	510
Appendicitis	430
Diarrhea and enteritis	402
Congenital malformations	387
Cancer, all forms	379
Leukemias and aleukemias	333
Diseases of buccal cavity and adnexa	290

*Source: U. S. Bureau of the Census, Vital Statistics of the United States.
*Compiled by Statistical Bureau, Metropolitan Life Insurance Company, April 11, 1946.

Age Four

Causes	*Deaths*
All Causes of Death	9,093
Accidents	2,530
Influenza and pneumonia	1,112
Diphtheria	428
Appendicitis	390
Tuberculosis, all forms	327
Cancer, all forms	277
Leukemias and aleukemias	274
Congenital malformations	270
Diseases of buccal cavity and adnexa	247
Diseases of the heart	227

Ages Five to Nine

Causes	*Deaths*
All Causes of Death	31,698
Accidents	9,887
Influenza and pneumonia	2,736
Diseases of the heart	1,589
Appendicitis	1,570
Tuberculosis, all forms	1,252
Cancer, all forms	940
Diseases of buccal cavity and adnexa	866
Congenital malformations	826
Diphtheria	800
Leukemias and aleukemias	742

Ages Ten to Fourteen

Causes	*Deaths*
All Causes of Death	30,944
Accidents	9,791
Diseases of the heart	2,687
Influenza and pneumonia	2,217
Tuberculosis, all forms	2,072
Appendicitis	1,908
Cancer, all forms	904
Nephritis, all forms	865
Acute rheumatic fever	729
Leukemias and aleukemias	600
Congenital malformations	537

Ages Fifteen to Nineteen

Causes	*Deaths*
All Causes of Death	58,492
Accidents	18,445
Tuberculosis, all forms	9,118
Diseases of the heart	4,314
Influenza and pneumonia	3,074
Puerperal causes	2,403
Appendicitis	2,086
Cancer, all forms	1,574
Nephritis, all forms	1,540
Homicide	1,525
Suicide	1,148

May we call to your attention the prominent position which accidents have in this tabulation.

Infectious Diseases (Diarrhea and enteritis, influenza and pneumonia, meningitis, diphtheria and others).—The universal application of known and proven preventive measures would materially reduce the deaths from infectious diseases. In the period from 1910 to the present, reductions in deaths from these diseases have occurred and it is reasonable to suppose that further reductions will continue.

What Should Our Aims Be in Preventing or Controlling:

a. heart disease?

Heart disease in children can be divided into two classes, congenital and acquired.

(1) Congenital heart disease. There are no known methods of preventing congenital heart disease. In controlling this type of heart affliction certain selected cases constituting a small proportion are amenable to surgical treatment.

(2) Acquired heart disease. The chief cause of acquired heart disease in children is rheumatic fever and further discussion will be found under that heading.

b. cerebral paralysis?

Cerebral paralysis in children is primarily due to cerebral maldevelopment prior to birth or to adverse conditions at the time of birth. Maldevelopment of the brain before birth cannot be prevented in the light of our present knowledge and there is little likelihood of means of prevention being discovered or applied in the immediate future. Cerebral paralysis developing at birth is in the field of obstetrics rather than pediatrics. Perhaps some results might be obtained by further education along eugenic lines and the recognition of the importance of the Rh factor in certain cases of mental defect.

c. cancer?

Cancer in infancy and childhood is not a serious problem. Other groups primarily interested in the adult are better qualified to suggest aims in the prevention and control of this important health problem.

d. tuberculosis?

The prevention of tuberculosis and the control of its spread is dependent upon the utilization of available medical knowledge concerning this disease. Few children need have tuberculosis if there is a universal recognition and acceptance of the importance of the prevention of contacts of the child with tuberculous individuals in the home, school, and community. An equally important measure for the prevention of tuberculosis is the adequate pasteurization and proper sanitary control of all milk used for human consumption both in a fluid state and in the various milk products. This might be helped by certification of herds of cattle.

The control of tuberculosis in children should include universal case finding facilities. The isolation of open cases of tuberculosis and the adoption of periodic health examinations for all children. Adequate means of handling tuberculous cases in sanitoria should be provided.

e. diabetes?

Diabetes in children does not constitute a serious problem numerically.

f. pneumonia?

Pneumonia in childhood becomes a problem in direct proportion to the health of the child prior to the onset of the infection. The well-nourished, well-developed individual who becomes ill with the disease responds quickly and favorably to present-day methods of treatment.

g. poliomyelitis?

The National Foundation for Infantile Paralysis is in the best position to speak on this subject. Continued research would appear to be the logical aim so as to develop methods of preventing this disease and controlling its spread.

h. rheumatism and arthritis?

Rheumatism and arthritis are diseases of adult life and are rarely found amongst children.

i. rheumatic fever?

As far as is now known, the prevention of rheumatic fever is chiefly dependent upon the general principles enumerated in the preliminary statement; especially, adequate housing and proper food. The disease is rarely found amongst children who are well fed and properly housed. Continued research in an effort to find the cause of this disease and methods for its control should be carried out.

The control of rheumatic fever is dependent upon its early recognition, and appreciation of the potential danger and long time supervision.

j. veneral disease?

The prevention and control of veneral disease is primarily a problem of early adult life. Adequate knowledge, properly given to adolescents by competent educators should be a part of the health education of all adolescents.

k. malaria?

The prevention and control of malaria is primarily a question of sanitation. The eradication of the *Anopheles* mosquito will prevent the spread of this disease.

l. dental defects?

The dental profession is best qualified to discuss this subject.

m. defects of vision?

The vast majority of visual defects seen in childhood are of congenital origin. Continued research should be encouraged in an effort to obtain more knowledge concerning the cause of such defects and possible means of prevention.

The control of defects of vision should include parental education concerning the importance of early recognition and the adequate care and treatment of this condition.

Facilities should be available in all schools for at least gross visual tests.

n. defects of hearing?

The same statements made under (*m*) defects of vision, apply concerning hearing. Education programs for the hard of hearing should be extended.

o. mental ill health?

(1) Mental defects for which we have no method of prevention or control. The provision for adequate custodial facilities for all such individuals should be encouraged and accelerated. Education and rehabilitation of those not idiots or imbeciles may make them useful members of society.

(2) Psychotic disturbances. Because so little is known concerning psychotic disturbances, research in this field should be encouraged and expanded.

(3) Emotional maladjustments. The prevention of emotional maladjustments is dependent upon a better understanding of the importance to the child of a normal family, school and community life. Our aims should be to bring about a wider recognition of the influence of the home, school and community on the child. All schools should have access to psychologic and psychiatric consultation. Mental hygiene programs, taking into account the prenatal and neonatal periods are most important preventive measures.

II. Over the Next 5 Years, What Should Be Our Goals on Health Personnel, Facilities, and Education?

What Should Our Aims Be With Respect to the Number and Distribution of Qualified:

a. doctors?

At the present time, the American Academy of Pediatrics is conducting a national survey covering every county throughout the nation to ascertain all the facilities available for the medical care of children. This is the first attempt to survey such facilities that has been made. All previous surveys have been based upon samples and the American Academy of Pediatrics does not consider that a survey conducted by the sampling method can furnish the information that its present undertaking will reveal. Too frequently such samples fail to present conditions as they exist. It was not possible to carry on this survey while the war was in progress and a survey made at that time would not have revealed conditions during normal times. With the termination of hostilities, however, preparations were immediately begun and the survey in one state (North Carolina) has already been completed and the data is now being compiled. In the other states preparations are going ahead rapidly and it is expected that these data will become available within a matter of months. With the completion of this survey, it will be possible to make more concrete recommendations in answer to the first and second sections of Part II of this questionnaire.

The present Academy survey will have some very definite information regarding the distribution of adequate medical care for children in the states.

b. dentists?

To be answered by the American Dental Association.

c. nurses?

To be answered by the National Nursing Societies.

What Should Our Aims Be With Respect To:

a. medical research?

Research investigators are born and no amount of money can provide the inherent qualities necessary in such an individual. However, such individuals should be provided with adequate facilities and funds to carry on their work. Because of the reduction from private sources of such funds, government should promote medical research by all possible means. In this connection, it is extremely important that the control and policies rest with competent persons or groups with as little governmental control as possible.

b. professional medical education:

The Academy survey will bring out the needs of medical education for the care of children in this country. Perhaps we may find that there are needed more or better coordinating courses in the medical schools and that postgraduate education for pediatricians and general practitioners with respect to the care and treatment of children should be promoted. It is certain that we cannot have better medical care for children until we have more physicians well trained in pediatrics.

c. health education for the public:

Pediatricians do a much better job by individual instruction to the mother than can be done when instructing a large group of individuals because these problems are individual problems. As the number of pediatricians increases this health education to the public will increase. In those centers in which pediatric care for children has been stressed over a longer period, the results have been in the main the best. The education of the public comes only after years of effort.

The Academy Study of Child Health Services

It has been clearly demonstrated from the experience to date that a group of physicians, practitioners in a field of medicine, can carry on a so-called study or an investigation of their own activities with the object of putting their house in order. It has furthermore been shown that a group of clinicians can work effectively and harmoniously with Federal agencies which, by virtue of their established organization, are experts in techniques and have the advantages of experience in the field of analysis and the accumulation of data. Both the Federal agencies, the Children's Bureau and the U. S. Public Health Service, and the American Academy of Pediatrics realize that "isolationism" in the future progress of medical care cannot exist. The evidence of the awareness of this united front is one of the most encouraging and important observations of the Study to date and cannot be overemphasized.

With these facts in mind and the organization fully developed and launched on a national scale, the time has come when we who are actually making the investigation must ask ourselves, "What are we going to get out of this? What do we want to show from this elaborate undertaking?" We must continually have our eye on the beam and our sights lifted upon our target. It is only too easy and all too common for a research worker to be confused by his technique and diversified data and never arrive at the goal and objective of his study. This danger is one of which we must be continually aware. With the tremendous expenditure of funds, the multitudinous and somewhat involved schedules, it would be very easy to lose sight of our objective and not see the forest for the trees. Before giving consideration to the anticipated conclusions of our Study, the membership of the Academy should bear in mind that there will inevitably be many disappointments as the investigation reaches completion. We undertook this Study with little idea of what it entailed. No one connected with the original committee who presented the program to the Academy had ever had any firsthand experience in a statistical study of this kind and magnitude. Certainly we had no realization of its cost. We were unable to find a person who had had experience in directing such an effort and were obliged to develop one, and in this, I should add, we have been successful. The Study was put in our laps—it had to be done. No one can ever question the vision of the Academy in accepting the responsibility and opportunity in the interests of medical care for children. In spite of our many handicaps and especially our lack of experience, we predict that the disappointments and unanswered questions will be outbalanced by positive findings which will direct the future development of medical practice in the care of children.

Many of the results of the Study are already known. Some are impressions, and impressionistic knowledge is dangerous. Perhaps one of the most urgent needs and most anticipated information concerns degree and distribution of medical care for children. If our thesis is correct that medical care for children increases their potential development, it follows that this should have wide distribution and be made available to all. It is very easy and impressive to make maps showing that pediatricians are located in urban communities, but this by no means answers the question whether the children of our cities are having medical attention commensurate with our standards of pediatric care of today. It seems highly probable that in our own backyard we will find flagrant instances where hospitals are overcrowded, where premature infants, for instance, are receiving inadequate care, where facilities and trained personnel are not available. The members of the Academy expect to receive factual data concerning these matters and anticipate recommendations for their improvement.

One of the most urgent and pressing results of the Study concerns the distribution of medical care on a national geographical scale. Many of us have little or no idea at present concerning the care of children in states outside our limited horizon. We are certain that the mortality of infants and children in states with a high percentage of Negro population in the South is greater than in states of higher income groups, but we have never taken adequate

measures to rectify this condition. We are justified in expecting that our Study will reiterate and conclusively show the level of medical care in these states and, because these data were collected by practicing physicians, an added impetus for improving medical care and facilities is predicted.

One of the questions we must answer from our investigation is closely related to distribution of medical care and concerns the technique of practice. Is the average pediatrician of today working effectively in the light of the needs for medical care, both in his community and the states at large? Is he making too many and unnecessary visitations or is he making too few? Certainly many trained pediatricians are running in circles and are groping for a technique of practice that will give them financial security and a feeling of a medical *fait accompli*. Certainly if our Study shows the spotty distribution of medical care which we anticipate, then some new and better technique retaining the principle of free enterprise must be formulated. One has a right to ask if the trained pediatrician, in the light of the present needs, is justified in carrying on the solo type of practice that is so common in many communities. A good businessman with an article to sell studies areas where his product is needed. If it is a razor, he teaches the unshaven to shave and works out a technique for the wider distribution of his razor. Our Study should awaken such objectives in us who have had certain medical training for the care of children. Furthermore, the realization of these objectives should not be the sole responsibility of Federal agencies but a cooperative effort of pediatricians and agencies.

We have, therefore, now arrived at a most critical period of our investigation which should contribute to the better care of children on both a national and state level. It is a period when we must critically analyze these data which we have collected through our personal efforts. We must formulate again the questions which we consider should be answered. The data will be handled by expert statisticians, but they must know what we expect to learn from the collection of the material. Some of our results may not lend themselves to analytical methods but will be reported descriptively. These are problems to which your Executive Staff of the Study are now giving their attention. Soon many of the findings of the North Carolina Pilot Study will be presented to the Academy and it is hoped that through discussion and suggestions of our members we will be able to formulate a final report which will adequately utilize these data and permit us to inaugurate intelligently a constructive program for the better care of children.

WARREN R. SISSON.

The Social Aspects of Medicine

Dear Dr. Park:

The enclosed report on Russian Public Health and Soviet Medicine by Dr. Smorodintzev to Mrs. Berezowsky while he was at the Rockefeller Institute on a recent visit to this country seems to me interesting enough to deserve publication. Mrs. Berezowsky tells me that she has no objection to its being edited in order to make it appropriate for some particular journal. It occurred to me that with editing you might be able to use it in your column.

Sincerely,

ALLAN M. BUTLER, M.D.

RUSSIAN PUBLIC HEALTH AND SOVIET MEDICINE

DR. ANATOL SMORODINTZEV*

AS TOLD TO ALICE BEREZOWSKY

Until 1919, Russia was, from the medical point of view, a potential danger of the first magnitude to Europe. Russia was the stopping off place for the epidemic diseases which moved West from the Far East, China, and India. Cholera, typhus, and smallpox, as well as other epidemic diseases, ravaged the Russian population and only the strictest border control stemmed their advance upon Europe. Even the dread plague, which comes especially from India and China, existed in our country. As far west as St. Petersburg, there were epidemics of cholera. There was no obligatory vaccination for smallpox. Regularly each year there was an average of 200,000 cases, with 40,000 mortalities. The general mortality rate in Russia was 29 per 1,000. The average life span was only 40 years. One-half of Russia's children contracted infectious diseases before the age of one year. Only one-third of the children born survived. The only favorable factor was the very high birth rate; mothers having from six to ten children. But motherhood was a frustrating process for the women of Russia and they were weakened by it.

The sanitary conditions in Russia were appalling. Good water supply was practically unknown. Even in Moscow and St. Petersburg, a great many people drank water directly from the Neva and Moscow rivers. Typhoid and dysentery were everywhere. The incidence of syphilis was high. In contrast to the United States much of it of a nonsexual origin, owing to the extremely primitive mode of life and low state of sanitary culture in the rural districts where a man who contracted syphilis infected his entire family with the disease. In primitive regions such as those where the Bashkirians and Tartars live, a high percentage of the population was infected.

In Czarist times, the cause of Russia's frightful health conditions did not lie with the medical and scientific men themselves. The fault was that a corrupt and inefficient bureaucracy gave our medical and scientific men almost no support. State medicine, although it existed, was never given sufficient funds to accomplish even a fraction of the necessary work. Only private charitable contributions made possible the greater part of whatever constructive and beneficial work was done in clinical and preventive medicine and scientific research. Starved for funds, the Department of Public Health did little for the prevention of infectious diseases; all matters of public hygiene were, for the most part, neglected.

Before the revolution, there were only twelve medical schools in all Russia. For a population of upwards of 170,000,000, there were less than 25,000 doctors, that is, about

*Winner, 1941, of the first Stalin Prize for distinguished service to the Soviet Union, and now Chief of Department of Bacteriology Parker Institute of Leningrad and an Executive Director of Institute of Experimental Medicine.

one for every 8,000 people. But of these 25,000 doctors, 80 per cent lived in the big cities and were in private practice. Therefore, in many regions, especially the northern and eastern districts, there was sometimes only one doctor for every 20,000 of the population.

After the revolution, the whole medical picture was changed by the issuance of a government statement: "*Medical Affairs Are the Responsibility Not Only of the Medical and Scientific Branches But of All Branches of the State: Economic, Cultural and Industrial.*" Thus it was clearly established that it was the duty of the economists to provide funds for necessary work; of the cultural branch to foster the education of medical and scientific personnel and the enlightenment of the people in all matters concerning public health; and of the industrial branch to concern itself with both clinical and preventive health protection of the workers. We medical and scientific men were given great responsibility, but we were not given more than our share . . . *all* the responsibility.

Almost as soon as it was established, the Soviet Government resolved to subsidize all education. Anyone who wanted to study medicine or science could do so without expense. Now, in Soviet Russia, a student receives not only his education free of charge, but he is also paid a salary sufficient to cover all the necessities of his life while learning—food, rent, books, and clothing.

Those students who are interested in gaining a higher education (and the possibility is open to all) decide what future field they want to enter during the last two years of their attendance at middle school, the equivalent of American high school. As soon as a student in middle school shows an aptitude or inclination toward a certain branch of learning, he is encouraged by the State to pursue it, to go on and acquire a higher education, and then to engage in postgraduate work. The standards for the selection of students for superior education are high. They must do excellent work, not only in the subjects in which they are especially interested but in all their academic studies. If they are graded "excellent," and about 5 per cent are, they can enter the higher institutions of learning without examination. Those students who do poor academic work are channeled off into occupational and industrial schools. Those who do fair or average work are given three to four years additional study in order that they may become what we call "middle personnel," that is, assistants to the top men in every field. The more a student excels, the more money the government spends on him, paying him a higher salary and enabling him to become a specialist. For a specially gifted student, increased stipendiums are given which equal the salary of a young medical doctor, a graduate. There are thousands of such students in Russia, in all branches of learning.

Our medical students receive their M.D. degrees at the age of 23 to 25 years. Then, in return for what the State has done for them, they are required to work for the State for three years, but they receive a full salary. This is an obligation they are happy to fulfill. The only duty of the newly graduated doctor is to go where he is needed most, which is usually somewhere near his university. After his State service is done, he can choose where and what he would like to do. Unless he wishes to undertake special work where the opportunity for study and practice is in only one place, the young doctor or scientist usually elects to go back to the community he came from, where his home, family, and friends are. Then he sets about earning his living, generally in State service.

Prior to the war, the average doctor was paid by the State 650 rubles monthly. As he progresses, a doctor's salary is raised about 50 per cent. Doctors of Science (Ph.D.) receive treble the minimum salary, about 1,200 to 1,800 rubles a month. A professional person can also increase his earning by doing extra work. He can attach himself as consultant to an organization other than that with which he is officially connected and receive a consultant's fee. He can also engage in writing and lecturing and such activities. All extra work entitles a doctor to extra compensation from those interested in obtaining his services, institutions, publishers, and such. Every six months to a year, a doctor is encouraged to visit one of the big district Institutes for Post-Graduate Medical Study (of which there are twenty) to do refresher work and keep up with the latest scientific developments. At the age of 55, he is entitled to retire on government pension. If he

wishes, a doctor can enter private practice without forfeiting his pension. His earnings as a private practitioner are subject to progressive taxation very much like American taxation on earned income. There is, however, no compulsory age of retirement.

There is a widespread belief outside Russia that there is no private practice of medicine in our country. This is not true. Every doctor can, if he so desires, enter private practice immediately on completion of his three years' practical service to the State. A small percentage do so. However, since exactly the same medical service is open to all citizens of Russia at no cost, very few patients choose to go to a private physician and pay for medical care. Those who do are most likely to choose not a young doctor but an experienced practitioner who has retired from State service.

There is also widespread belief that in a system of socialized medicine such as we have in the U.S.S.R., a patient cannot choose his or her physician. The contrary is true. Once a patient is registered at a polyclinic or medical institution, he is encouraged to choose the doctor in whom he has the most confidence. Doctors are taught to give individual consideration to their patients, to encourage mutual understanding and familiarize themselves with their patients' backgrounds and personal situations.

Concerning Soviet medicine, the most incorrect assumption of all is that Russia's prerevolutionary men of science and medicine were discarded or liquidated by the Soviet Government. All Soviet medicine was built on the nucleus that existed in Czarist times. Immediately upon the revolution, Lenin issued an appeal to all men of science to cooperate with the government. He told them that their possibilities for doing constructive work would be better than ever before and he promised them they would be free from all private worries in money matters. The great majority of professional men accepted. Those who rejected his invitation were, for the most part, very old and very conservative.

Take the case of our famous physiologist, Pavlov. For the first ten years of the Soviet regime he did not accept socialism. But he continued his work undisturbed. It was during the years 1925 to 1930 that he began to change his opinion. During the last years of his life, he became very enthusiastic about socialized medicine. At the International Physiological Congress held in Moscow in 1935, he made a speech to the assembled scientists, and said: "The only thing I fear is that I will not live long enough to repay in some measure the Soviet Government for the great attention they have paid to Science."

Today, in the U.S.S.R., more than 50 per cent of the members of our Academy of Science (the most distinguished body of its kind in Russia) were professional persons in the Czarist regime. This is true of its president, Vladimir Komaroff. The Chief Surgeon of the Red Army, Burdenko, was an important man in Czarist army medicine. In fact, it was around a nucleus of the members of the Medical Military Academy (founded by Peter the Great) that we assembled our entire military medical service.

The results of the Soviet Government's organization of science and medicine and of its fight against epidemic diseases were in evidence from 1926 on. By 1933 and 1934, we had almost eradicated smallpox by establishing compulsory vaccination. Each year we give more than 10,000,000 immunizations. Today, if I wanted to show a medical student a case of smallpox, I would have trouble finding one in all Russia. We have almost eradicated plague and cholera, despite the fact that the prevalence of these diseases among the masses in China and India is a constant danger to us. Typhus, the fatal enemy of our people during and after World War I, no longer exists as a problem. From the medical point of view, the U.S.S.R. has, since 1919, performed a service for the Western world similar to that which Russia rendered in the time of Genghis Khan. She has completely repelled the Asiatic invaders, in this case, not men but diseases.

As I said before, in 1919, we had twelve medical schools in all Russia. Now we have sixty. Leningrad and Moscow each have four medical schools, each of them independent of the other. Every year each graduates from 500 to 600 students. In the last years before World War II, we graduated 25,000 young doctors annually. In 1941, an extremely difficult year owing to the invasion of our country by the Germans, we nevertheless graduated 18,000 doctors. In 1942, there were 24,000. In 1943, there were about 30,000, which was more than ever before.

In Czarist Russia there was only one school where women were permitted to study medicine. That school was very expensive and only the minority of women interested in science and medicine could attend. After the revolution, every medical school in Russia was opened to women students. Before World War II, 60 per cent of our medical students were women. During it, for obvious reasons, 90 per cent were women. We have found that women make just as fine doctors as men. Practically the entire field of pediatrics, for example, has been taken over by women. The only branch of medicine which is less popular among women is major surgery—that is for physical reasons, not mental.

When Hitler came into power, we Russians were sure that war would come. We knew that in modern war it is not possible to have military success without good epidemic control in the rear. We realized that in order to have wartime medicine there must first be peacetime medicine. We were also fully persuaded that a healthy army can be produced only by a healthy people.

One of our greatest contributions to wartime medicine was a peacetime medical development, the blood bank. As soon as it was scientifically established in the early nineteen-thirties that blood transfusions were beneficial to traumatic surgical cases, we conceived the idea of the blood bank. Owing to cooperation between the cultural and scientific branches of the government, we had no difficulty in establishing the bank and convincing people of their moral obligation to donate blood. From then on, we have always had more donors than we could accept.

It is entirely owing to the tremendous strides we made in peacetime medicine that we were able, in a very short time, to organize an efficiently functioning wartime medicine. One of the most important factors in its success was the great amount of "middle personnel" we trained in peacetime. Today, there are available three assistants for each doctor. Our successes against Germany are attributable not only to the Red Army, but also to the high state of development of medical science both in the army itself and in the rear.

Today, despite all we have been through, the incidence of epidemic disease in Russia is not a single per cent higher than it was before the war! We accomplished this while we were fighting against almost the full might of Hitler's divisions, the slave labor of most of Europe, and in the face of the difficulties attendant on the transfer of great numbers of our population, when millions of people were on the move. In the West, after war came, we had to evacuate entire regions of all possible medical equipment and personnel in the same manner we transported our industry away from the invaded areas to the Urals, Siberia, and the Far East.

The record of our care of war casualties shows that of every 100 wounded men and women, 78 per cent were able to fight again. Only 22 per cent were lost to the Armed Forces.

For scientists and medical men there is very little difference between war and peace from the professional point of view. We always conceive our medical duty as being the same as in battle; we are obligated to give all necessary help to our people. The chief purpose of medicine is to make people physically perfect. The aim of our Russian men of science is to make both ourselves and the quality of our work better and better. We have already accomplished much, but there is as much again and more still to be done. We have conquered typhus, but we have not conquered influenza. We have wiped out smallpox, but we know very little about measles and scarlet fever, very serious diseases for children.

When transportation is easier, we Russian scientists and medical men look forward to the closest possible cooperation with our American colleagues. In America you had a perfectly organized wartime medicine. You had the best equipment and the best doctors.

Everywhere, men and women of science are agreed that the chief purpose of medicine is to make all human beings as physical perfect as possible. And after all, a sick person is a sick person, rich or poor, in war and peace.

Academy News and Notes

The Nominating Committee of the Academy of Pediatrics which was recently appointed by the President, feels a very serious obligation in the selection of candidates for the various offices of the Academy to be presented to the membership at the next annual meeting. Never was there a time in which the necessity for outstanding leadership was so pressing. Office in the Academy should not be a decoration for past performance but should be a pledge for future endeavor and for vigorous leadership.

Your committee hopes to have the advice of the entire membership in the selection of these candidates and requests that members write their suggestions regarding the candidates to any member of the committee: Wyman C. C. Cole, Preston A. McLendon, Howard J. Morrison, or Edward B. Shaw (Chairman).

The following members of the Academy have been released from service:

Army

Horst A. Agerty, Wynnewood, Pa.
Fred H. Allen, Jr., Holyoke, Mass.
Warren F. Belknap, Detroit, Mich.
Sidney S. Chipman, Norwalk, Conn.
Vincent Del Duca, Camden, N. J.
A. S. Finkelstein, Newark, N. J.
Sidney Gelman, Paterson, N. J.
Arthur Heyman, Newark, N. J.
Clinton Hollister, Santa Barbara, Calif.
Albert M. Jones, Memphis, Tenn.
Morris Y. Krosnick, New Haven, Conn.
Aims C. McGuinness, Philadelphia, Pa.
William G. Motel, Chicago, Ill.
Charles E. Muhleman, La Porte, Ind.
Norman K. Nixon, Beverly Hills, Calif.
Victor Rudomanski, Kearny, N. J.
Samuel Shwartz, Washington, D. C.
Joseph F. Siegel, Washington, Pa.
Hugh Wellmeier, Piqua, Ohio

Navy

Harry H. Horwitz, Oakland, Calif.
A. S. Hurt, Jr., Richmond, Va.
Abram Kanof, Brooklyn, N. Y.
John A. Lichty, Jr., Rochester, N. Y.
William T. Maxson, Lexington, Ky.
A. Lane Mitchell, Houston, Texas
Leonard B. Outlar, Wharton, Texas
Jack E. Strange, New Orleans, La.
Wallace B. Taggart, Dayton, Ohio
Alvin B. Williams, San Jose, Calif.

The following members have been released from the United States Public Health Service:

Katharine G. Dodge, New York, N. Y., and
Samuel Hurwitz, San Francisco, Calif.

Lieutenant Commander Milton Kurzrok has been promoted to Commander in the United States Navy.

News and Notes

Grants of over $486,000 for the study of tropical diseases, virus diseases, biochemistry, nutrition, physiology, and other subjects in the field of medical and physical sciences, made by the John and Mary R. Markle Foundation during 1945, are announced in the final report of John A. Ferrell, medical director of the Foundation, who retired on July 1. The grants include appropriations to sixty-two universities, medical schools, research institutes, schools of public health, and other research agencies.

Effective July 1, John M. Russell, former assistant to President James B. Conant of Harvard University, will become executive director of the John and Mary R. Markle Foundation. His appointment follows election to a vice-presidency of the Foundation in April of this year.

Dr. Hart E. Van Riper, of Scarsdale, N. Y., has been appointed medical director of the National Foundation for Infantile Paralysis, Inc., it was announced by Basil O'Connor, the organization's president. Dr. Van Riper has served as acting medical director since January. The appointment was made to fill the vacancy created by the death of Dr. Don W. Gudakunst earlier this year.

The increased funds made available to the Children's Bureau during the closing days of this congressional session will make it possible for some expansion in staff to take place. Positions are open in the division which administers grants-in-aid to States for maternal and child health and crippled children, and in the division concerned with research in the health field.

In the administrative program there are 4 or 5 openings for pediatricians with special training in various phases of clinical pediatrics such as care of the premature infant, rheumatic fever, and school health to act as consultants on the staff of the Children's Bureau. There are also several openings for pediatricians with public health training, or experience, or both, in regional offices of the Children's Bureau.

In the research field there are openings for a pediatrician with experience and special interest in the treatment of cerebral palsy, and one with an interest in special testing procedures for examination of school-age children.

All positions require basic training and experience equivalent to that required for certification by the American Board of Pediatrics. Interested persons may write directly to the U. S. Children's Bureau, Federal Security Agency, Washington 25, D. C.

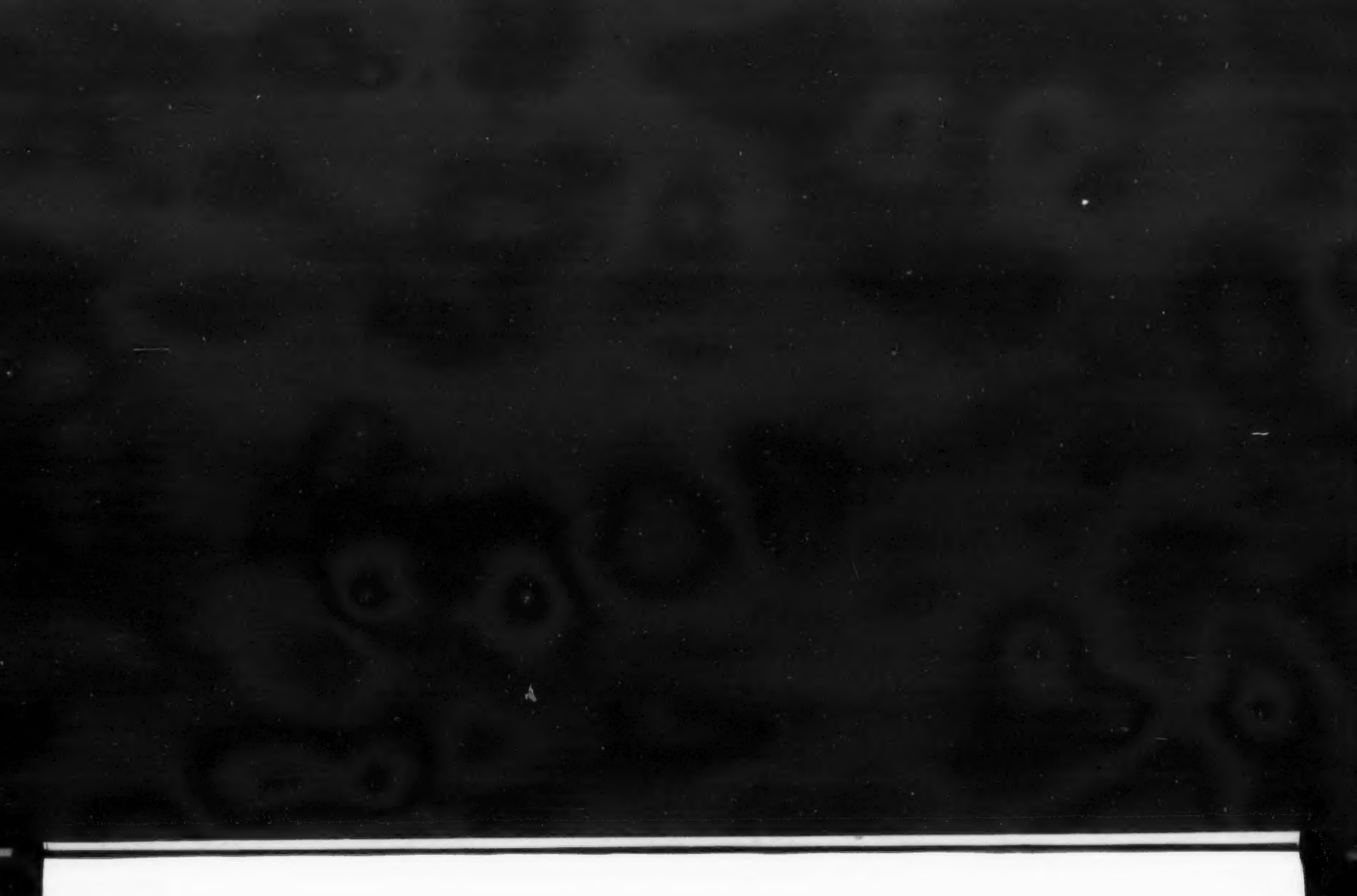
Book Reviews

Mitchell-Nelson Textbook of Pediatrics. Waldo E. Nelson, M.D., Philadelphia, 1945, W. B. Saunders Company, 1,350 pages. Price $10.00.

This fourth revised edition has been completely rewritten. There are forty-nine collaborators, each wisely chosen for his special subject, to whom the book owes most of its value. In addition to the general excellence of treatment of subject matter, the physical make-up of the single volume is particularly good. The type is easily legible in double columns on pages 10 by 7 inches, which lie flat without assistance of the reader. There are 519 illustrations of 333 figures, 26 in color, which are, for the most part, unusually good. The book will be specially useful to the undergraduate student for reading supplementary to lectures and to the post-graduate student taking "refresher" courses who has lost contact with recent pediatric literature.

A. F. H.

The 1945 Year Book of Pediatrics. Edited by Isaac A. Abt, D.Sc., M.D. Professor of Pediatrics, Northwestern University Medical School, Chicago. With the Collaboration of Arthur F. Abt, B.S., M.D., Associate Professor of Pediatrics, Northwestern University Medical School, Chicago. Fabrikoid. Price, $3.00. Pp. 448, with 113 illustrations. Chicago, 1946, The Year Book Publishers, Inc.

The annual appearance of this digest of the more important original articles in medical journals makes an excellent review of current pediatric literature. The articles are abstracted fully. It is always surprising how many articles have been missed during the course of a year's reading when this book appears as a reminder. Whether one considers himself a busy practitioner with all-too-little time for reading or really takes time to keep up with the current literature, this volume will be useful. It is, of course, a satisfactory way to maintain a permanent file of such articles in book form, year by year.

McCulloch.